



REPORT

OF THE

DIRECTOR OF THE MINT

UPON THE

PRODUCTION OF THE PRECIOUS METALS

IN THE

UNITED STATES

DURING THE

CALENDAR YEAR 1901.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1902.

TREASURY DEPARTMENT,

Document No. 2304.

Director of the Mint.

CONTENTS.

	Page.
LETTER OF TRANSMITTAL	5
PART I:	
Production of gold in the United States, 1901	9
Production of silver in the United States, 1901	12
Deposits and redeposits of gold	17
Deposits and redeposits of silver	19
Coinage of the United States	21
Bars manufactured	22
Purchases of silver	22
Imports and exports of the precious metals	23
Movement of gold from the United States	26
Imports and exports of the principal countries of the world	27
The market for silver in 1901	32
Exports of silver to the East	33
Imports and exports of bullion into and from London	34
Value of net imports of silver into India since 1835	34
Gold and silver imported into and exported from British India	35
Stock of money in the United States	36
Gold and silver used in the industrial arts	37
World's industrial consumption of the precious metals	42
World's production of gold and silver in 1901	47
World's coinage	49
The future of the gold supply	51
Reports of the special agents of the Bureau of the Mint on the production of the precious metals in 1901 in the several States and Territories	59
I.—Alaska	61
II.—Arizona	67
III.—California	90
IV.—Colorado	104
V.—Idaho	149
VI.—Montana	151
VII.—Nevada	159
VIII.—New Mexico	178
IX.—Oregon	185
X.—Southern Appalachian States	189
XI.—South Dakota	200
XII.—Utah	203
XIII.—Washington	212
XIV.—Wyoming	216
PART II:	
Production of gold and silver in foreign countries	217
Africa	294
Argentina	260
Australasia	289
Austria-Hungary	271
Belgium	271
Bolivia	257
Brazil	251
British India	282
British North America	219
Central America	240
Chile	259
China	277
Colombia	244
East Indies	284

PART II—Continued.

Production of gold and silver in foreign countries—Continued.

Ecuador	250
Finland	267
France	272
Germany	269
Great Britain	269
Greece	276
The Guianas	246
The Netherlands	272
Italy	275
Japan	283
Korea	281
Mexico	228
Norway	267
Paraguay	261
Peru	254
Porto Rico	240
Portugal	275
Russia	262
Siam	282
Spain	273
Sweden	268
Switzerland	276
Turkey	276
Uruguay	261
Venezuela	249
Yukon (<i>see</i> British North America)	219

PART III. GENERAL STATISTICS:

TABLE I.—Deposits and purchases of gold and silver, by weight	312
II.—Deposits and purchases of gold and silver, by value	314
III.—Deposits of unrefined gold of domestic production, by weight	316
IV.—Deposits of unrefined gold of domestic production, by value	316
V.—Deposits of unrefined silver of domestic production, by weight	318
VI.—Deposits of unrefined silver of domestic production, by value	318
VII.—Bars manufactured, by weight	320
VIII.—Bars manufactured, by value	320
IX.—Recoinage of United States gold and silver coins, calendar year 1901	322
X.—Quantity and cost of silver used in the coinage of silver dollars	324
XI.—Quantity and cost of metal obtained by transfer and purchase for subsidiary coinage	325
XII.—Silver for subsidiary coinage	326
XIII.—Coinage of the United States during the calendar year 1901	328
XIV.—Assets and liabilities of mints and assay offices December 31, 1901	330
XV.—Unrefined domestic gold and silver bullion deposited at the mints and assay offices to the close of the calendar year 1901	332
XVI.—Production of gold and silver in the United States, annually, from the organization of the Mint	333
XVII.—Highest, lowest and average price of silver in London since 1833	334
XVIII.—Ratio of silver to gold each year since 1687	335
XIX.—Imports of gold and silver coin and bullion, by districts	336
XX.—Imports of gold and silver coin and bullion, by countries	338
XXI.—Exports of domestic gold and silver	340
XXII.—Exports of foreign gold and silver	342
XXIII.—Recapitulation of imports and exports	344
XXIV.—Imports and exports of the principal countries of the world	345
XXV.—Coinage of nations, 1899, 1900, and 1901	370
XXVI.—World's production of gold and silver, 1899, 1900, and 1901	371
XXVII.—Production of gold and silver in the world since the discovery of America	374
XXVIII.—Coinages of the United States, by denominations and values, since the organization of the Mint	376
XXIX.—Fractional and subsidiary coinage since 1792	377
XXX.—Coinages, by institutions, from organization of the Mint	378

LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
BUREAU OF THE MINT,
Washington, D. C., November 15, 1902.

SIR: I have the honor to hand you herewith my report on the production of gold and silver in the United States and in the world for the calendar year 1901, together with such information as to their coinage and consumption as this Bureau has been able to gather. The returns for this country have been carefully obtained through officials and special agents of this Bureau, and the aggregate of precious metals reported has been actually traced from production to market. The figures are therefore conservative, but are believed approximately full. The statistics for foreign countries are obtained from official sources wherever governmental calculations are made, and where such returns can not be had the best obtainable estimates are given and the authority stated.

Respectfully,

GEO. E. ROBERTS,
Director of the Mint.

The SECRETARY OF THE TREASURY.

PART I.

PRODUCTION, EMPLOYMENT, AND MOVEMENT OF GOLD AND SILVER
IN THE UNITED STATES, AND SURVEY OF THE WORLD'S
PRODUCTION OF GOLD AND SILVER IN 1901.

GENERAL REPORT.

PRODUCTION OF GOLD IN THE UNITED STATES, CALENDAR YEAR 1901.

During the calendar year 1901 the United States produced 3,805,500 ounces of gold of the value of \$78,666,700 as against 3,829,897 ounces of the value of \$79,171,000 for 1900, showing a decrease for 1901 of \$504,300, or about 0.637 per cent.

The silver product for the year 1901 amounted to 55,214,000 ounces of fine silver of the commercial value (at 60 cents per ounce fine) of \$33,128,400 as against 57,647,000 ounces of the commercial value of \$35,741,140 for the previous year, a decrease in the output for 1901 of 2,433,000 fine ounces and a loss in commercial value, due in part to the lower price in silver, of \$2,612,740.

The average price of silver fell from 62 cents in 1900 to 60 cents in 1901.

Comparing the total value of the precious metals produced in the United States for 1901, \$111,795,100, with that of the previous year, \$114,912,140, shows a decrease for 1901 of \$3,117,040, or 2.7+ per cent.

Of the producing States and Territories, ten increase their output of gold to the extent of \$2,687,800, while the remaining States show a decrease of \$3,192,100. Eight States show an increase of 2,271,700 ounces fine silver, the remaining States a decrease of 4,704,700 ounces.

Alaska.—The total yield of the precious metals in the Territory in 1901 was \$1,302,006 less than it was the previous year. The decrease was chiefly in gold, which amounted to \$1,285,300 (its silver product under all circumstances being inconsiderable). This loss is explained by the fact that the backward season delayed the opening of the placers and that litigation interfered with the development of the industry. There were also some few sources of supply which became exhausted.

Arizona.—In this Territory there was a decrease of \$110,400 in gold and of \$169,770 in silver—a total loss of \$280,170, which was due to various causes, fires in several of the largest mines, strikes, caving in, litigation, and shutting down for the purpose of making improvements. The fall in the price of copper likewise tended to cause a reduction in the production of the precious metals, but there were some new discoveries which promise to become productive.

California.—With the exception of Nevada, California recorded the greatest increase in the production of precious metals, showing a gain in gold of \$1,075,200, entirely due to a normal development of the industry, but a decrease in silver of \$28,308, leaving a net increase in the total production of \$1,046,892.

Colorado.—Colorado's total production fell off \$2,773,238—gold, \$1,135,900, and silver, \$1,637,338. This was the heaviest loss recorded by any State and is explained by the decline in the grade of ores, the tonnage having increased.

Georgia.—Georgia's production is always insignificant; it, however, increased from \$116,948 in 1900 to \$124,740 in 1901, a gain of \$7,792, or 6.66 per cent.

Idaho.—Although Idaho's outturn of gold increased by \$144,600, her silver product shows a decrease of \$660,302, making a net loss in the State's production of the precious metals of \$515,702, a loss due, it is stated, to various temporary causes.

Michigan.—Michigan does not rank high as a producer of the precious metals, her product in 1900 amounting to only \$92,240 and in 1901 to \$79,400, a net decrease of \$12,840, her gold output having increased \$1,800 and her silver having diminished \$14,641.

Montana.—Montana's loss in production in 1901, compared with 1900, was \$876,028. The decrease in silver was \$922,128, which was partly offset by a gain in gold of \$46,100. The loss in the production of silver was due to the fall in the price of copper and to the partial cessation of lead mining.

Nevada.—Of all the gold and silver producing States and Territories, Nevada made the greatest gain, \$1,202,706, both metals showing an improvement, gold to the extent of \$957,600 and silver to the amount of \$245,106. The increase in gold was largely from the newly discovered camp of Tonapah, in Nye County, although almost every county in the State showed an increase.

New Mexico.—Gold production in New Mexico fell off \$144,500, while silver increased \$68,774, leaving her net loss in the production of the precious metals \$75,726. The decrease in the outturn of gold was due to the closing down of several smelters and to the fear on the part of some of the mine owners that there would be an increase in freight and smelter rates. The decline in the price of copper and lead also tended to lessen the output of gold.

North Carolina.—North Carolina's production is comparatively insignificant. She, however, increased her yield of both gold and silver in 1901 over 1900 by almost 100 per cent in both cases, the greatest percentage gain made by any State. Her production of gold in 1901 was \$55,500 as against \$28,500 in 1900, an increase of \$27,000, and of silver, \$12,180 in 1901, against \$6,944 in 1900, a total increase of \$32,236 over the production of 1900, which was \$35,444, against \$67,680 in 1901.

Oregon.—Oregon, in proportion to her annual output, made a substantial gain in both gold and silver in 1901 over 1900; in the former the increase was \$123,400, or about 12 per cent, and in the latter \$24,512, or approximately 35 per cent. The total increase was \$147,912, nearly 8½ per cent. The product in 1900 was \$1,766,248 against \$1,914,160 in 1901. Oregon recorded a good increase in spite of the fact that several of the large mines were shut down, some for the purpose of making repairs and others on account of labor disturbances.

South Carolina.—South Carolina's gold product dropped off \$46,700, or nearly 40 per cent. Her silver yield (which is so small as to be a negligible quantity) decreased over 50 per cent, making a total loss of \$74,428, the yield in 1901 having been only \$46,820 against \$121,248 in 1900.

South Dakota.—In South Dakota the gold yield for 1901 increased by about 5 per cent over that of 1900, or \$301,900, which, however, was nearly offset by a loss of \$285,644 in silver, leaving a net gain of only \$16,256, her total product in 1901 having been \$6,526,300.

Texas.—Texas, at best a limited producer of the precious metals, with a production of \$297,088 in 1900, dropped off \$13,048 in 1901, \$12,548 of which was in silver.

Utah.—Utah lost in gold \$228,000, but increased in silver \$710,568, making her net increase \$428,568, or about 4½ per cent. She made a greater gain than any other State in silver, almost all of which came from the Park City district. The increase in the silver product was largely due to the development of copper mining.

Washington.—In Washington there was a large decrease in the gold output of the year, it being \$137,700 less than it was in 1900, a loss of about 19 per cent. There was a gain in the silver yield of \$67,450, thus making the net decrease \$70,250. It is stated, however, that, notwithstanding this decrease in production, the mining industry of the State is in an extremely healthy and promising condition.

Wyoming.—Wyoming produces only a small amount of the precious metals. The yield was \$25,540 in 1901 against \$34,324 in 1900, a decrease of \$8,784, or over 25 per cent.

Miscellaneous.—The remaining group of States—Alabama, Maryland, Missouri, Tennessee, and Virginia—which in 1900 produced \$6,062 worth of the precious metals, yielded in 1901 \$8,880, a gain of nearly 48 per cent, due, in part, to the development in the copper industry.

Comparative statements of the production of the precious metals in 1900 and 1901 in the several States and Territories are found in the following tables:

TABLE SHOWING THE PRODUCT OF GOLD IN THE SEVERAL STATES AND TERRITORIES IN 1900 AND 1901, AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR.

State or Territory.	Value.			
	1900.	1901.	Increase.	Decrease.
Alaska	\$8, 171, 000	\$6, 885, 700	.....	\$1, 285, 300
Arizona	4, 193, 400	4, 083, 000	.....	110, 400
California	15, 816, 200	16, 891, 400	\$1, 075, 200	.....
Colorado	28, 829, 400	27, 693, 500	.....	1, 135, 900
Georgia	116, 700	124, 500	7, 800	.....
Idaho	1, 724, 700	1, 869, 300	144, 600	.....
Michigan	29, 000	30, 800	1, 800	.....
Montana	4, 698, 000	4, 744, 100	46, 100	.....
Nevada	2, 006, 200	2, 963, 800	957, 600	.....
New Mexico	832, 900	688, 400	.....	144, 500
North Carolina	28, 500	55, 500	27, 000	.....
Oregon	1, 694, 700	1, 818, 100	123, 400	.....
South Carolina	121, 000	46, 700	.....	74, 300
South Dakota	6, 177, 600	6, 479, 500	301, 900	.....
Texas	1, 100	600	.....	500
Utah	3, 972, 200	3, 690, 200	.....	282, 000
Washington	718, 200	580, 500	.....	137, 700
Wyoming	34, 200	12, 700	.....	21, 500
Alabama	6, 000	8, 400	2, 400	.....
Maryland				
Missouri				
Tennessee				
Virginia				
Total	79, 171, 000	78, 666, 700	2, 687, 800	3, 192, 100
Net decrease .....	.....	.....	.....	504, 300

TABLE SHOWING THE PRODUCT OF SILVER IN THE SEVERAL STATES AND TERRITORIES IN 1900 AND 1901, AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR.

State or Territory.	Weight.			
	1900.	1901.	Increase.	Decrease.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Alabama.....	100	100		
Alaska.....	73,300	47,900		25,400
Arizona.....	2,995,500	2,812,400		183,100
California.....	941,400	925,600		15,800
Colorado.....	20,483,900	18,437,800		2,046,100
Georgia.....	400	400		
Idaho.....	6,429,100	5,542,900		886,200
Michigan.....	102,000	81,000		21,000
Montana.....	14,195,400	13,131,700		1,063,700
Nevada.....	1,358,700	1,812,500	453,800	
New Mexico.....	431,300	563,400	129,100	
North Carolina.....	11,200	20,300	9,100	
Oregon.....	115,400	160,100	44,700	
South Carolina.....	400	200		200
South Dakota.....	536,200	78,000		458,200
Texas.....	477,400	472,400		5,000
Utah.....	9,267,600	10,760,800	1,493,200	
Washington.....	224,500	314,400	119,900	
Wyoming.....	200	21,400	21,200	
Virginia.....		700	700	
Total.....	57,647,000	55,214,000	2,271,700	4,704,700
Net decrease.....				2,433,000

The average price of silver for 1900 was 62 cents, and for 1901 60 cents per fine ounce.

In estimating the gold yield of the United States in any given year only that gold is looked upon as really produced that has been refined, made ready for the market, and the ascertained amount of domestic origin (which is comparatively insignificant) that has been exported to foreign countries for reduction.

It has been the custom of the Bureau of the Mint to make for every calendar year two independent calculations of the gold product of the country, and to take their mean as the closest approximation that can be had to the actual output of the mines. The first of these is based on the amount of gold put upon the market by private refineries during the year, plus the fine gold contained in the unrefined of domestic production deposited at the mints and assay offices of the United States, plus the pure metal of domestic production contained in ores, copper matte, etc., exported to other countries for reduction. The second calculation is based on the known disposition made of the newly produced gold in any calendar year. Such gold is either deposited at the mints and assay offices of the United States, or exported from the United States in form of bullion, ores, or copper matte, or used in the industrial arts. If foreign gold bullion enters into any of the above items its amount must, of course, be deducted.

Put in tabular form, the first calculation of the gold product of the United States in the calendar year 1901 assumes the following shape:

APPROXIMATE GOLD PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1901.

Items reported for 1901.	Fine ounces.
Domestic product, in fine gold bars, reported by private refineries.....	2,711,825
Unrefined gold of domestic production deposited at the mints and assay offices.....	1,084,670
Domestic gold contained in ores, copper matte, etc., exported for reduction.....	15,874
Total.....	3,812,369

The second calculation of the gold yield of the mines of the United States in the calendar year 1901, reduced to a table, is as follows:

APPROXIMATE DISPOSITION OF THE GOLD PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1901.

Disposition.	Fine ounces.
Bullion deposited at the mints and assay offices classified as of domestic production..	4,563,263
Less refinery bars deposited and reported to this Bureau as from old material	8,832
Net new material deposited	4,554,431
Domestic bullion other than United States Mint or assay office bars exported from the United States, as per custom-house returns	18,676
Domestic gold in ores, copper matte, etc., exported	15,874
Bullion of domestic production reported by private refineries in the United States as having been made into bars for manufacturers and jewelers for use in the industrial arts.	51,221
Total	4,613,202
Deduct foreign bullion reported to the Bureau of the Mint by private refineries in the United States as contained in their product of fine gold bars deposited at the mints and assay offices or entered at the custom-houses for exportation as of domestic production, but derived from foreign ores	844,898
Net total	3,798,304

The difference between the results of these two calculations is only 14,065 ounces, or about 0.37 per cent, a variation so slight that the mean of the two estimates, 3,805,336—in round numbers 3,805,500 ounces—may be taken as the actual output of the mines of the country.

The silver product of the United States in any given calendar year is estimated in precisely the same manner as the gold product, namely, by making two independent calculations of the same and taking their mean as the actual product.

APPROXIMATE SILVER PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1901.

Items reported for 1901.	Fine ounces.
Domestic product in fine silver bars reported by private refineries	55,448,985
Unrefined silver of domestic production deposited at the mints and assay offices	424,544
Domestic silver contained in ores, copper matte, etc., exported for reduction	185,638
Total	56,059,167

The second calculation, or disposition of the silver yield of the mines of the United States in the calendar year 1901, is as follows:

APPROXIMATE DISPOSITION OF THE SILVER PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1901.

Disposition.	Fine ounces.
Bullion deposited at the mints and assay offices classified as of domestic production...	1,637,706
Domestic bullion other than United States Mint or assay office bars exported from the United States as per custom-house returns	86,177,880
Domestic silver in ores, copper matte, etc., exported	185,638
Bullion of domestic production reported by private refineries in the United States as having been made into bars for manufacturers and jewelers, for use in the industrial arts.	10,508,147
Increase in the approximate stock of silver bars, exclusive of any bars bearing the stamp of a United States mint or assay office in the United States, held by the Mercantile Safe Deposit Company and other institutions at the close of the calendar year 1901, according to information furnished this Bureau	91,990
Total	98,601,361
Deduct foreign bullion reported to the Bureau of the Mint by private refineries in the United States as contained in their product of fine silver bars deposited at the mints and assay offices, or entered at the custom-houses for exportation as of domestic production, but derived from foreign ores	44,233,292
Net total	54,368,069

The average, in round numbers 55,214,000 fine ounces, or 1,717,705 kilograms, fine, valued at \$71,387,800, is the estimated yield.

In addition to the above sources of information this Bureau has, for a number of years, been collecting statistics of mining production through special agents in the several States and Territories. The following table is a summary of their reports, which are given in another part of the present report:

PRODUCT OF GOLD AND SILVER IN THE INDIVIDUAL STATES AND TERRITORIES,
REPORTED BY MINT OFFICERS AND AGENTS, FOR THE CALENDAR YEAR 1901.

State or Territory.	Gold.		Silver.			Total value (silver at commer- cial value).
	Fine ounces.	Value.	Fine ounces.	Coining value.	Commercial value.	
Alabama.....	183	\$3,783	41	\$53	\$25	\$3,808
Alaska.....	335,346	6,932,227	51,433	66,499	30,860	6,963,087
Arizona.....	202,981	4,196,000	3,200,000	4,137,374	1,920,000	6,116,000
California.....	821,845	46,989,044	950,831	1,229,356	570,499	17,559,543
Colorado.....	1,342,712	27,756,313	18,557,068	23,992,977	11,134,241	38,890,554
Georgia.....	7,139	147,576	673	870	404	147,980
Idaho.....	92,750	1,917,313	5,591,734	7,229,717	3,355,040	5,272,353
Maryland.....	7	145				145
Michigan.....	1,490	30,801	81,031	104,767	48,619	79,420
Montana.....	232,331	4,802,708	14,180,545	18,334,442	8,508,327	13,311,035
Nevada.....	149,942	3,099,566	2,021,631	2,613,826	1,212,979	4,312,545
New Mexico.....	34,657	716,424	767,830	992,750	460,698	1,177,122
North Carolina.....	2,922	60,403	26,315	34,023	15,789	76,192
Oregon.....	88,759	1,834,811	163,873	211,876	98,324	1,933,135
South Carolina.....	6,158	127,297	307	397	184	127,481
South Dakota.....	314,855	6,508,630	84,461	109,202	50,677	6,559,307
Tennessee.....	12	248	5	6	3	251
Texas.....	30	620	472,423	610,810	283,454	284,074
Utah.....	184,803	3,820,216	11,319,860	14,635,779	6,791,916	10,612,132
Virginia.....	313	6,470	1,044	1,350	626	7,096
Washington.....	31,987	664,230	377,381	487,927	226,429	887,659
Wyoming.....	2,000	41,344	25,000	32,323	15,000	56,344
Total.....	3,853,222	79,653,169	57,873,486	74,826,324	34,724,094	114,377,263

The total product of the precious metals reported by mint officers and agents in the foregoing table somewhat exceeds either of the above calculations of this Bureau, the difference between this total and the lower of the two estimates being 1.44 per cent for gold and 6.44 per cent for silver. A difference between the two sets of figures is naturally to be expected, inasmuch as they do not relate to the same thing, the figures reported by mint officers and agents representing the estimated fine contents of the ore, whereas the estimates of this Bureau deal with the finished product only. That the calculations of this Bureau, nevertheless, approximate very closely the results obtained from the mines by mint officers and agents in the several States and Territories vouches for the practical accuracy of the estimates.

The following table gives the weight and value of the finished product, by States, as estimated at this Bureau:

APPROXIMATE DISTRIBUTION BY PRODUCING STATES AND TERRITORIES OF THE PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FOR THE CALENDAR YEAR 1901.

[As estimated by the Director of the Mint.]

State or Territory.	Gold.		Silver.			Total value (silver at commercial value).
	Fine ounces.	Value.	Fine ounces.	Coining value.	Commercial value.	
Alabama.....	150	\$3,100	100	\$129	\$60	\$3,160
Alaska.....	333,096	6,885,700	47,900	61,931	28,740	6,914,440
Arizona.....	197,515	4,083,000	2,812,400	3,636,234	1,687,440	5,770,440
California.....	817,121	16,801,400	925,600	1,196,736	555,360	17,446,760
Colorado.....	1,339,673	27,693,500	48,437,800	23,838,772	11,062,680	38,756,180
Georgia.....	6,023	124,500	400	517	240	124,740
Idaho.....	90,427	1,869,300	5,542,900	7,166,578	3,325,740	5,195,040
Michigan.....	1,490	30,800	81,000	104,727	48,600	79,400
Montana.....	229,495	4,744,100	13,131,700	16,978,360	7,879,020	12,623,120
Nevada.....	143,374	2,963,800	1,812,500	2,343,435	1,087,500	4,051,300
New Mexico.....	33,302	688,400	563,400	728,436	338,040	1,026,440
North Carolina.....	2,685	55,500	20,300	26,246	12,180	67,680
Oregon.....	87,950	1,818,100	160,100	206,998	96,060	1,914,160
South Carolina.....	2,259	46,700	200	259	120	46,820
South Dakota.....	313,446	6,479,500	78,000	100,849	46,800	6,526,300
Texas.....	29	600	472,400	610,780	283,440	284,040
Utah.....	178,513	3,690,200	10,760,800	13,912,954	6,456,480	10,146,680
Virginia.....	256	5,300	700	905	420	5,720
Washington.....	28,082	580,500	344,400	445,285	206,610	787,140
Wyoming.....	614	12,700	21,400	27,669	12,840	25,540
Total.....	3,805,500	78,666,700	55,214,000	71,387,800	33,128,400	111,795,100

The sources of the production of gold and silver in the United States, compiled from the reports made by mint officers and agents, are given in the following table:

DISTRIBUTION OF THE GOLD AND SILVER PRODUCT OF THE UNITED STATES FOR THE CALENDAR YEAR 1901 AS TO SOURCES OF PRODUCTION.

[As reported by Mint officers and agents.]

State or Territory.	Gold.		Silver.		
	Quartz.	Placer.	Quartz.	Lead ores.	Copper ores.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Alabama.....	116	67	41	.....	.....
Alaska.....	94,957	240,389	51,433	.....	.....
Arizona.....	197,900	5,081	1,795,000	205,000	1,200,000
California.....	630,713	191,132	195,369	47,122	708,340
Colorado.....	1,313,687	29,025	4,639,267	13,917,801	.....
Georgia.....	6,266	873	673	.....	.....
Idaho.....	56,289	36,461	1,080,352	4,511,382	.....
Maryland.....	7	.....	.....	.....	.....
Michigan.....	1,490	.....	.....	.....	81,031
Montana.....	207,045	25,286	3,646,623	397,029	10,136,893
Nevada.....	148,321	1,621	1,619,443	402,188	.....
New Mexico.....	31,768	2,889	201,785	130,626	435,419
North Carolina.....	2,026	896	.....	99	26,216
Oregon.....	19,969	68,790	160,503	3,370	.....
South Carolina.....	5,775	383	307	.....	.....
South Dakota.....	314,855	.....	84,461	.....	.....
Tennessee.....	12	.....	.....	5	.....
Texas.....	30	.....	472,423	.....	.....
Utah.....	184,803	.....	1,761,234	7,357,482	2,201,144
Virginia.....	185	128	617	.....	427
Washington.....	27,034	4,953	329,677	46,240	1,464
Wyoming.....	.....	2,000	25,000	.....	.....
Total.....	3,243,248	609,974	16,064,208	27,018,344	11,790,934

^aLead and copper ores.

As seen from the foregoing table, Alaska furnishes nearly one-half of all the placer gold and California more than one-fourth; nearly three-fourths of Alaska gold is placer gold; placer mining is of considerable relative importance in Idaho and Oregon. On the whole, however, quartz mining predominates in the United States.

With regard to silver, on the contrary, quartz mining occupies, on the whole, the second place. Of the main silver-producing States and Territories, only Arizona, Nevada and Oregon show preponderance of quartz mining; copper mining as a source of silver production predominates only in Montana and New Mexico.

The first place is held by the product from lead ores. In the table next below the results of the year 1901 are compared with former years. As seen from this table, the distribution of the silver product among the several sources of production showed a slight change in 1901 as compared with 1900, the percentage of silver derived from lead ores having increased about 4 per cent, while that obtained from copper bullion decreased in the same proportion.

DISTRIBUTION OF THE SILVER PRODUCT OF THE UNITED STATES AS TO THE SOURCES OF PRODUCTION.

Source.	1891.	1897.	1898.	1899.	1900.	1901.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Quartz mills	49.2	21.8	24.7	28.0	27.4	27.8
Lead bullion.....	40.6	57.5	56.2	51.1	50.8	46.7
Copper bullion.....	10.2	20.7	19.1	20.9	21.8	25.5
Total.....	100	100	100	100	100	100

The annual production of gold and silver from the mines of the United States since 1860 is shown in the following table:

(The commercial value of the silver product is reckoned at the average yearly market price of silver and its coining value in United States dollars.)

PRODUCT OF GOLD AND SILVER FROM MINES IN THE UNITED STATES SINCE 1860.

[The estimate for 1860-1872 is by R. W. Raymond, commissioner, and since 1872 by the Bureau of the Mint.]

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1860.....	2, 225, 250	\$46, 000, 000	116, 015	\$157, 000	\$150, 000
1861.....	2, 080, 125	43, 000, 000	1, 546, 875	2, 062, 000	2, 000, 000
1862.....	1, 896, 300	39, 200, 000	3, 480, 469	4, 685, 000	4, 500, 000
1863.....	1, 935, 000	40, 000, 000	6, 574, 219	8, 842, 000	8, 500, 000
1864.....	2, 230, 088	46, 100, 000	8, 507, 812	11, 443, 000	11, 000, 000
1865.....	2, 574, 759	53, 225, 000	8, 701, 171	11, 642, 000	11, 250, 000
1866.....	2, 588, 063	53, 500, 000	7, 734, 375	10, 356, 000	10, 000, 000
1867.....	2, 502, 197	51, 725, 000	10, 441, 406	13, 866, 000	13, 500, 000
1868.....	2, 322, 000	48, 000, 000	9, 281, 250	12, 307, 000	12, 000, 000
1869.....	2, 391, 563	49, 500, 000	9, 281, 250	12, 298, 000	12, 000, 000
1870.....	2, 418, 750	50, 000, 000	12, 375, 000	16, 734, 000	16, 000, 000
1871.....	2, 101, 313	43, 500, 000	17, 789, 062	23, 578, 000	23, 000, 000
1872.....	1, 741, 500	36, 000, 000	22, 236, 328	29, 396, 000	28, 750, 000
Total	29, 012, 908	599, 750, 000	118, 065, 232	157, 366, 000	152, 650, 000

PRODUCT OF GOLD AND SILVER FROM MINES IN THE UNITED STATES SINCE 1860—
Continued.

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1873.....	1,741,500	\$36,000,000	27,650,000	\$35,890,000	\$35,750,000
1874.....	1,620,563	33,500,000	28,849,000	36,869,000	37,300,000
1875.....	1,615,725	33,400,000	24,518,000	30,549,000	31,700,000
1876.....	1,930,162	39,900,000	30,009,000	34,690,000	38,800,000
1877.....	2,268,788	46,900,000	30,783,000	36,970,000	39,800,000
1878.....	2,476,800	51,200,000	34,960,000	40,270,000	45,200,000
1879.....	1,881,787	38,900,000	31,550,000	35,430,000	40,800,000
1880.....	1,741,500	36,000,000	30,320,000	34,720,000	39,200,000
1881.....	1,678,612	34,700,000	33,260,000	37,850,000	43,000,000
1882.....	1,572,187	32,500,000	36,200,000	41,120,000	46,800,000
1883.....	1,451,250	30,000,000	35,730,000	39,660,000	46,200,000
1884.....	1,489,950	30,800,000	37,800,000	42,070,000	48,800,000
1885.....	1,538,325	31,800,000	39,910,000	42,500,000	51,600,000
1886.....	1,693,125	35,000,000	39,440,000	39,230,000	51,000,000
1887.....	1,596,375	33,000,000	41,260,000	40,410,000	53,350,000
1888.....	1,604,841	33,175,000	45,780,000	43,020,000	59,195,000
1889.....	1,587,000	32,800,000	50,000,000	46,750,000	64,646,000
1890.....	1,588,880	32,845,000	54,500,000	57,225,000	70,465,000
1891.....	1,604,841	33,175,000	58,330,000	57,630,000	75,417,000
1892.....	1,596,375	33,000,000	63,500,000	55,563,000	82,101,000
1893.....	1,739,323	35,955,000	60,000,000	46,800,000	77,576,000
1894.....	1,910,813	39,500,000	49,500,000	31,422,000	64,000,000
1895.....	2,254,760	46,610,000	55,727,000	36,445,000	72,051,000
1896.....	2,568,132	53,088,000	58,835,000	39,655,000	76,069,000
1897.....	2,774,935	57,363,000	53,860,000	32,316,000	69,637,000
1898.....	3,118,398	64,463,000	54,438,000	32,118,000	70,384,000
1899.....	3,437,210	71,053,000	54,764,000	32,859,000	70,806,000
1900.....	3,829,897	79,171,000	57,647,000	35,741,000	74,533,000
1901.....	3,805,500	78,666,700	55,214,000	33,128,400	71,387,800
Total	59,717,554	1,234,464,700	1,274,334,000	1,148,900,400	1,647,567,800
Grand total.....	88,730,462	1,834,214,700	1,392,399,232	1,306,266,400	1,800,217,800

Tables showing the product of gold and silver from mines of the United States since 1792 will be found in the appendix.

DEPOSITS OF GOLD.

The deposits of gold at the mints and assay offices during the calendar year 1901 contained 6,620,515 fine ounces, of the value of \$136,858,186, a decrease in value of \$21,202,071 from the amount reported for 1900.

The deposits of domestic bullion contained 4,563,263 fine ounces, of the value of \$94,331,004, showing a decrease of \$345,170.

This item includes bullion in a crude condition as received from the miner, refinery bars, and refined bullion, which is explained in the following paragraph.

For convenience of the Bureau the domestic bullion has been classified as unrefined, refinery bars, and refined bullion; unrefined being bullion received direct from the miners in its crude state, refinery bars (less than 0.992 in fineness) and refined bars (0.992 and over in fineness) being the product of certain smelters, refineries, cyanide and chlorination works deposited at the mints and assay offices.

DOMESTIC GOLD COIN.

The deposits and transfers of mutilated and uncurrent domestic gold coin amount to 75,817 fine ounces, valued at \$1,567,286, of which amount \$813,526 were transferred from the Treasury and \$753,760 were deposited by private individuals.

FOREIGN GOLD BULLION.

The deposits of foreign gold bullion contained 885,958 fine ounces of the value of \$18,314,367, of which \$17,312,573 represents the value of deposits of unrefined and \$1,001,794 the value of refined gold, reported to have been received from the countries named in the following statement:

Countries of production.	Fine ounces.	Value.
UNREFINED.		
British Columbia	59,219	\$1,224,150
Northwest Territory	524,417	10,840,666
Ontario and Quebec	17,279	357,177
Nova Scotia	28,162	582,159
Ottawa	5	110
Mexico	137,926	2,851,201
West Indies	336	6,937
Central America	26,144	540,439
South America	33,228	686,890
Turkey	4	89
Australia	2	36
China	19	393
New Zealand	10,750	222,216
Philippine Islands	5	110
Total unrefined	837,496	17,312,573
REFINED.		
New Zealand	38,301	791,763
Mexico	10,161	210,031
Total refined	48,462	1,001,794
Total foreign bullion	885,958	18,314,367

FOREIGN GOLD COIN.

The deposits of foreign gold coin received and melted contained 895,372 fine ounces of the value of \$18,508,984, as shown by the following table:

DEPOSITS OF FOREIGN GOLD COIN.

Country of coinage.	Fine ounces.	Value.
Great Britain	555,446	\$11,482,089
Spain	53,940	1,115,050
Costa Rica	25,120	519,283
Mexico	27,861	575,934
Japan	185,095	3,826,254
France	14,707	304,033
South America	81	1,634
Central America	958	19,812
Russia	2,424	50,107
Germany	322	6,658
Unclassified	29,418	608,130
Total	895,372	18,508,984

OLD GOLD JEWELRY.

The deposits of old jewelry contained 200,105 fine ounces of the value of \$4,136,545.

DEPOSITS OF SILVER.

Silver is coined in the United States on Government account only. Deposits of silver bullion are received by the mints and assay offices of the United States for return to the depositor in fine or unparted bars with the weight and fineness stamped thereon. The deposits of silver for return in fine bars are confined almost exclusively to the New York assay office, only a small amount being deposited at other institutions. Fine silver bars manufactured for depositors are either exported or sold for use in the industrial arts in the United States.

The deposits of silver during the calendar year 1901 amounted to 5,790,180 fine ounces of the coining value of \$7,486,293, and the redeposits contained 14,123,084 fine ounces of the coining value of \$18,260,149.

DOMESTIC SILVER BULLION.

The deposits of domestic bullion amounted to 1,637,706 fine ounces, of the coining value of \$2,117,438, which represents the crude bullion deposited by miners, as well as that received from refineries, chlorination works, etc.

For the convenience of the Bureau the domestic silver bullion has been classified as unrefined, refinery bars, and refined bars, similar to domestic gold bullion.

DOMESTIC SILVER COIN.

The deposits and transfers of mutilated and uncurrent domestic silver coin amounted to 2,357,336 fine ounces, of the coining value of \$3,047,769, of which 2,354,207 fine ounces were received from the Treasury for recoinage, representing a nominal or face value of \$3,453,229.95, which will produce \$3,254,475.98 in new subsidiary coin at a loss of \$198,753.97.

FOREIGN SILVER BULLION.

The deposits of foreign silver bullion, all of which were unrefined, contained 1,176,793 fine ounces of the coining value of \$1,521,510, reported to have been received from the following countries:

DEPOSITS OF FOREIGN SILVER BULLION.

Country of production.	Fine ounces.	Coining value.
British Columbia	21, 976	\$28, 413
Northwest Territory	126, 331	163, 337
Ontario and Quebec	5, 121	6, 620
Nova Scotia	1, 442	1, 865
Mexico	976, 921	1, 263, 089
Central America	17, 267	22, 325
South America	27, 423	35, 457
West Indies	312	404
Total	1, 176, 793	1, 521, 510

FOREIGN SILVER COIN.

The deposits of foreign silver coin received and melted contained 81,561 fine ounces of the coining value of \$105,453, which were received from the following countries:

DEPOSITS OF FOREIGN SILVER COIN.

Country of coinage.	Fine ounces.	Value.
Spain	683	\$883
Mexico	6	8
South America	6,330	8,185
Central America	60,343	78,019
West Indies	7,054	9,120
Unclassified	7,145	9,238
Total	81,561	105,453

OLD SILVER JEWELRY.

The deposits of old silver jewelry and plate contained 536,784 fine ounces of the coining value of \$694,023.

DEPOSITS OF GOLD AND SILVER SINCE 1880.

The following table shows the amount of gold and silver received at the mints and assay offices by calendar years since 1880:

GOLD AND SILVER (EXCLUDING REDEPOSITS) RECEIVED AT THE MINTS AND ASSAY OFFICES DURING THE CALENDAR YEARS SINCE 1880.

Calendar year.	Gold.	Silver (coining value).	Total.
1880.....	\$100,278,703	\$35,103,825	\$135,382,528
1881.....	98,763,426	30,326,848	129,090,274
1882.....	41,921,263	35,161,254	77,082,517
1883.....	51,089,456	36,978,184	88,067,640
1884.....	50,518,179	36,670,731	87,188,910
1885.....	44,714,052	35,836,725	80,550,777
1886.....	66,422,088	39,086,070	105,508,158
1887.....	74,724,077	46,381,333	121,105,410
1888.....	41,496,410	41,323,973	82,820,383
1889.....	42,599,206	41,977,265	84,576,471
1890.....	48,767,964	55,198,037	103,966,001
1891.....	60,849,552	70,994,120	131,843,672
1892.....	45,406,646	84,591,898	129,998,544
1893.....	69,419,223	62,465,005	131,884,228
1894.....	49,704,902	14,120,605	63,825,507
1895.....	69,433,579	13,843,636	83,277,215
1896.....	91,743,670	10,873,160	102,616,830
1897.....	87,924,232	12,707,128	100,631,360
1898.....	182,996,602	15,841,222	198,837,824
1899.....	129,798,782	13,481,927	143,280,511
1900.....	158,060,258	16,005,626	174,065,884
1901.....	136,858,186	7,486,293	144,344,479

COINAGE OF THE UNITED STATES.

The following table exhibits the number of fine ounces and value of gold and silver coinage of the United States, by calendar years, since 1873:

COINAGE OF GOLD AND SILVER OF THE MINTS OF THE UNITED STATES SINCE 1873.

Calendar year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
1873	2,758,475	\$57,022,748	3,112,891	\$4,024,748
1874	1,705,441	35,254,630	5,299,421	6,851,777
1875	1,594,050	32,951,940	11,870,635	15,347,893
1876	2,253,281	46,579,453	18,951,777	24,503,308
1877	2,128,493	43,999,864	21,960,246	28,393,045
1878	2,408,400	49,786,052	22,057,548	28,518,850
1879	1,890,499	39,080,080	21,323,498	27,569,776
1880	3,014,163	62,308,279	21,201,232	27,411,694
1881	4,685,162	96,850,890	21,609,970	27,940,164
1882	3,187,317	65,887,685	21,635,469	27,973,132
1883	1,414,581	29,241,990	22,620,701	29,246,968
1884	1,160,601	23,991,756	22,069,935	28,534,866
1885	1,343,519	27,773,012	22,400,433	28,962,176
1886	1,400,240	28,945,542	24,817,064	32,086,709
1887	1,159,664	23,972,383	27,218,101	35,191,081
1888	1,518,046	31,380,808	25,543,242	33,025,606
1889	1,035,899	21,413,931	27,454,465	35,496,683
1890	990,100	20,467,182	30,320,999	39,202,908
1891	1,413,614	29,222,005	21,284,115	27,518,857
1892	1,682,832	34,787,223	9,777,084	12,641,078
1893	2,757,231	56,997,020	6,808,413	8,802,797
1894	3,848,045	79,546,160	7,115,896	9,200,351
1895	2,883,941	59,616,358	4,407,055	5,698,010
1896	2,276,192	47,053,060	17,858,594	23,089,899
1897	3,677,878	76,028,485	14,298,769	18,487,297
1898	3,772,561	77,985,757	17,815,385	23,034,033
1899	5,386,277	111,344,220	20,156,957	26,061,520
1900	4,802,328	99,272,942	28,072,162	36,295,321
1901	4,930,439	101,735,188	23,851,621	30,838,461
Total	73,079,269	1,510,496,643	542,913,678	701,949,008

COINAGE OF THE UNITED STATES.

The following table shows the number of pieces and value of coinage made at the mints of the United States during the calendar year 1901:

COINAGE, CALENDAR YEAR 1901.

Description.	Pieces.	Value.
Gold	10,666,505	\$101,735,187.50
Silver dollars	22,566,813	22,566,813.00
Subsidiary silver coin	41,890,834	8,271,647.75
Minor coin	106,091,356	2,120,122.08
Total	181,215,508	134,693,770.33

Table will be found in the Appendix showing the value of the coinage made at each mint annually since 1792.

BARS MANUFACTURED, 1901.

The following statement shows the character and value of gold and silver bars manufactured during the calendar year 1901.

GOLD AND SILVER BARS.

Description.	Gold.	Silver.
Fine bars	\$51,497,963.03	\$3,612,985.00
Mint bars	4,093,933.39	371,267.79
Standard bars.....	287,916.47	8,431.53
Unparted bars	32,920,935.85	381,469.04
Total.....	88,800,748.74	4,374,153.36

PURCHASE OF SILVER.

The repeal of the purchasing clause of the act of July 14, 1890, by act of November 1, 1893, limited the purchase of silver to that contained in deposits of gold bullion, silver fractions for return in fine bars, the amount retained in payment for charges on silver deposits, surplus bullion returned by the operative officers on the annual settlement at the close of the fiscal year, and uncurrent and mutilated domestic coins purchased under provisions of section 3526 of the Revised Statutes for the subsidiary silver coinage.

The following tables show the quantity and cost of silver purchased for the subsidiary coinage during the calendar year 1901:

SILVER PURCHASED AT THE MINTS AND THE NEW YORK ASSAY OFFICE FOR SUBSIDIARY COINAGE DURING THE CALENDAR YEAR 1901.

Stock.	Standard ounces.	Cost.
Partings, charges, and fractions purchased.....	611,059.58	\$330,287.45
Porto Rican coins redeemed and melted	303.94	225.45
Melted assay coins purchased	846.77	1,005.39
Mutilated coins purchased.....	2,531.60	1,381.63
Surplus bullion purchased.....	11,811.12	6,762.25
Total.....	626,553.01	339,662.17

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER THE ACTS OF FEBRUARY 12, 1873, JANUARY 14, 1875, FEBRUARY 28, 1878, AND JULY 14, 1890.

Act authorizing.	Fine ounces.	Cost.	Average price per fine ounce.	Bullion cost of a silver dollar.
February 12, 1873	5,434,282.00	\$7,152,564.00	\$1.3162	\$1.0180
January 14, 1875	31,603,906.00	37,571,148.00	1.1888	.9194
February 28, 1878	291,272,018.56	308,279,260.71	1.0583	.8185
July 14, 1890	168,674,682.53	155,931,002.25	.9244	.7150
Total.....	496,984,889.09	508,933,974.96	1.0240	.7920

AMOUNT AND COST OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, AND USED IN THE COINAGE OF STANDARD SILVER DOLLARS, USED IN COINAGE OF SUBSIDIARY SILVER, WASTED AND SOLD IN SWEEPS, NUMBER OF DOLLARS COINED, AND SEIGNIORAGE ON SAME, FROM AUGUST 13, 1890, TO DECEMBER 31, 1901.

Disposition.	Fine ounces.	Cost.
Total amount purchased and cost of same.....	168,674,682.53	\$155,931,002.25
Used in coinage of standard silver dollars to Dec. 31, 1901	115,791,454.20	108,077,864.95
Used in coinage of subsidiary silver to Dec. 31, 1901	8,115,141.52	7,342,203.74
Wasted and sold in sweeps.....	63,570.37	62,535.64
Transferred to subsidiary purchase account.....	.31	.25
Total amount used.....	123,970,166.40	115,482,604.58
Balance on hand Dec. 31, 1901.....	44,704,516.13	40,448,397.67
Total.....	168,674,682.53	155,931,002.25

	Coinage.	Seigniorage.
Standard silver dollars coined to Dec. 31, 1901	\$149,710,163.00	\$41,632,298.05
Subsidiary silver coined to Dec. 31, 1901	11,218,443.30	3,876,239.56

BALANCE OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, ON HAND AT EACH MINT AND THE NEW YORK ASSAY OFFICE DECEMBER 31, 1901.

Institution.	Fine ounces.	Cost.
Mint at Philadelphia	33,754,960.59	\$30,541,302.49
Mint at San Francisco	665,053.72	601,735.25
Mint at New Orleans	10,021,592.66	9,067,481.08
Assay office at New York	262,909.16	237,878.85
Total.....	44,704,516.13	40,448,397.67

BALANCES OF SILVER BULLION.

Items.	Standard ounces.	Cost.
Purchased under act of July 14, 1890.....	49,671,684.59	\$40,448,397.67
For subsidiary silver coinage at mints and assay offices.....	2,310,119.30	2,171,027.58
At United States assay office in New York for payment of deposits in fine bars	34,573.53	34,573.53
Total.....	52,016,377.42	42,653,998.78

IMPORTS AND EXPORTS OF GOLD AND SILVER TO AND FROM THE UNITED STATES.

IMPORTS OF GOLD.

The value of gold imported into the United States during the calendar year 1901 was \$54,761,880, against \$66,749,084 for the calendar year 1900, a decrease of \$11,987,204. The value of gold bullion imported was \$11,999,633, of which amount \$5,164,052 came from Mexico, \$4,181,277 from Canada, \$1,020,018 from Australasia, \$655,309 from Central America, \$243,325 from Great Britain, and the remainder principally from South America.

Foreign gold coin of the value of \$16,871,584 was also imported, of which \$11,436,315 came from Australasia, \$3,998,900 from Japan, \$694,850 from Cuba, \$351,140 from Canada, \$200,172 from France, and the remainder from various countries.

The value of gold contained in ore and base bullion imported was \$21,524,251, of which \$18,951,084 came from Canada, \$2,308,884 from Mexico, and the remainder principally from South America.

There were returned to the United States gold coin of the value of \$4,366,412, of which \$1,784,630 came from Canada, \$974,650 from France, \$295,137 from Mexico, and the remainder from various countries.

GOLD IMPORTS, CALENDAR YEAR 1901.

Description.	Amount.
Foreign bullion (refined)	\$11,999,633
Foreign coin	16,871,584
Gold in ore and base bullion.....	21,524,251
Total foreign	50,395,468
United States coin.....	4,366,412
Total gold imports	54,761,880

GOLD EXPORTS.

The total value of gold exported from the United States during the calendar year 1901 was \$57,783,939, against \$54,134,623 for the calendar year 1900, or an increase of \$3,649,316.

Of the gold exported, \$56,532,423 was domestic and \$1,251,516 was foreign.

The value of United States assay office bars exported was \$46,492,737, of which amount \$33,982,318 went to France, \$11,004,210 to Germany, \$1,004,153 to Great Britain, and the remainder to various countries.

The value of domestic gold coin exported was \$9,325,485, of which amount \$3,775,000 went to Germany, \$2,539,095 to Canada, \$1,000,000 to Uruguay, \$850,000 to Netherlands, and the remainder to various countries.

The value of gold in domestic ores and copper matte exported was \$328,143, of which amount \$277,854 went to Great Britain, \$33,439 to Canada, and \$16,850 to Germany.

Foreign gold coin of the value of \$463,414 was exported, of which amount \$230,811 went to France, \$212,332 to Cuba, and the remainder to various countries.

Foreign gold bullion to the amount of \$103,656 was exported to Great Britain. Foreign gold ore and base bullion to the value of \$684,446 was exported to Canada.

GOLD EXPORTS, CALENDAR YEAR 1901.

Description.	Amount.
United States assay office bars.....	\$46,492,737
Other bullion.....	386,058
United States coin.....	9,325,485
Gold ore and base bullion.....	328,143
Total domestic	56,532,423
Foreign bullion reexported	\$103,656
Foreign coin reexported	463,414
Foreign ore and base bullion reexported	684,446
	1,251,516
Total gold exports.....	57,783,939

SILVER IMPORTS.

The silver imports into the United States from all sources during the calendar year 1901 aggregated \$31,146,782, against \$40,100,343 imported during the previous year, a decrease of \$8,953,561.

The commercial value of foreign silver bullion imported was \$8,433,137, of which amount \$7,857,921 came from Mexico, \$504,292 from Central America, \$52,496 from South America, and the remainder from various countries.

Silver coins of the United States of the value of \$326,406 were returned to the country, of which amount \$169,473 came from Canada, \$127,872 from the West Indies, \$17,570 from Japan, and the remainder from various countries.

Foreign silver coins of the value of \$4,198,444 were also imported, of which \$3,620,140 came from Mexico, \$457,994 from Central America, \$28,081 from the West Indies, \$48,299 from South America, and the remainder from various countries.

Foreign silver ore and base bullion imported contained \$18,188,795, of which amount \$14,093,647 came from Mexico, \$2,563,851 from Canada, \$1,507,265 from South America, and the remainder from various countries.

SILVER IMPORTS, CALENDAR YEAR 1901.

Description.	Amount.
Foreign bullion	\$8, 433, 137
Foreign coin	4, 198, 444
Silver in ore and base bullion.....	18, 188, 795
Total foreign	30, 820, 376
United States coin.....	326, 406
Total silver imports	31, 146, 782

SILVER EXPORTS.

The value of silver exported during the calendar year 1901 amounted to \$55,638,358, against \$66,221,658 exported during the calendar year 1900, showing a decrease of \$10,583,300. The domestic exports amounted to \$51,657,057 and the foreign to \$3,981,301.

Of the domestic exports of silver bullion, \$44,732,679 went to Great Britain, \$4,507,540 to China and Hongkong, \$1,050,655 to France, \$851,138 to Mexico, and the remainder to various countries.

The value of silver in domestic ores and base bullion exported was \$111,383; of which \$102,155 went to Great Britain, \$6,428 to Canada, and \$2,800 to Germany.

There was exported domestic silver coin amounting to \$283,402, of which \$231,712 went to the West Indies; \$48,485 to Canada, and the remainder to various countries.

Foreign silver coin amounting to \$3,981,201 was exported, of which \$3,220,484 went to Hongkong, \$286,550 to Great Britain, \$171,261 to Canada, \$196,150 to Mexico, and the remainder to various countries.

Foreign silver bullion valued at \$100 was exported to Great Britain.

SILVER EXPORTS, CALENDAR YEAR 1901.

Description.	Amount.
Silver bullion	\$51,262,272
United States coin	283,402
Silver in ore and base bullion	111,383
Total domestic	51,657,057
Foreign bullion reexported	\$100
Foreign coin reexported	3,981,201
	3,981,301
Total silver exports	55,638,358

In the appendix will be found tables exhibiting the imports and exports of the precious metals, by customs districts and by countries, for the calendar year 1901, kindly compiled by the Bureau of Statistics for use in this report.

MOVEMENT OF GOLD FROM THE PORT OF NEW YORK.

The superintendent of the United States assay office at New York has kindly prepared the following tables, giving exports of gold through the port of New York during the calendar year 1901:

STATEMENT OF UNITED STATES GOLD COIN AND GOLD BULLION EXPORTED FROM THE PORT OF NEW YORK TO EUROPE DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1901.

Date.	Country.	Amount.	Rate of exchange.
1901.			
January 16	France	\$1,648,672	\$4.87 $\frac{1}{4}$
January 23	do	4,057,642	4.87 $\frac{1}{4}$
January 30	do	2,379,854	4.87 $\frac{1}{4}$
Do	England	18,700	4.87 $\frac{1}{4}$
Do	Germany	2,100	4.87 $\frac{1}{4}$
February 9	England	13,885	4.88
March 26	do	5,966	4.88 $\frac{1}{4}$
March 29	France	250,000	4.88 $\frac{1}{4}$
Do	England	13,850	4.88 $\frac{1}{4}$
Do	Germany	150	4.88 $\frac{1}{4}$
April 1	do	505,003	4.88 $\frac{1}{4}$
April 3	France	1,002,631	4.88 $\frac{1}{4}$
April 23	England	1,033,053	4.88 $\frac{1}{4}$
April 25	France	548,857	4.88 $\frac{1}{4}$
April 29	Germany	1,758,885	4.88 $\frac{1}{4}$
May 1	do	256,000	4.88
Do	France	1,749,330	4.88
Do	Germany	250,000	4.88
May 8	do	509,000	4.87 $\frac{1}{4}$
Do	England	22,450	4.87 $\frac{1}{4}$
Do	Norway	249,000	4.87 $\frac{1}{4}$
May 15	France	1,997,841	4.88
May 16	Germany	200,000	4.88
May 17	do	250,000	4.88
May 22	France	513,000	4.88
May 29	do	4,052,300	4.88 $\frac{1}{4}$
June 11	Germany	400,000	4.88 $\frac{1}{4}$
June 17	do	3,255,000	4.88 $\frac{1}{4}$
June 19	do	1,259,698	4.88
Do	England	58,370	4.88
July 3	Germany	600,766	4.87 $\frac{1}{2}$
July 10	do	753,000	4.87 $\frac{1}{2}$
Do	do	3,100	4.87 $\frac{1}{2}$
Do	England	29,720	4.87 $\frac{1}{2}$
August	do	28,985	.....
September	do	25,130	.....
Do	Germany	2,050	.....
October 19	do	200,000	4.86 $\frac{1}{4}$
October 30	France	2,851,585	4.86 $\frac{1}{4}$
Do	England	11,506	4.86 $\frac{1}{4}$
November 4	do	1,502,109	4.87

STATEMENT OF UNITED STATES GOLD COIN AND GOLD BULLION EXPORTED FROM THE
PORT OF NEW YORK, ETC.—Continued.

Date.	Country.	Amount.	Rate of exchange.
1901.			
November 6	England	\$250,000	4.87
Do.	France	1,006,609	4.87
November 13	do	4,602,723	4.87½
November 18	Germany	250,000	4.88
Do.	do	1,764,650	4.88
Do.	France	5,821,166	4.88
November 23	Germany	225,792	4.87½
Do.	do	25,000	4.87½
Do.	do	2,700	.....
Do.	England	19,188	.....
December 2	Germany	2,117,372	4.87½
December 4	do	300,000	4.87½
December 11	do	500,000	4.86½
Do.	do	252,944	4.86½
Do.	Austria	253,056	4.86½
Do.	Germany	2,850	.....
Do.	England	7,170	.....
Total .....	.....	51,670,408	.....

RECAPITULATION OF GOLD EXPORTS TO EUROPE.

Description.	England.	France.	Germany.	Norway.	Austria.	Grand total of exports to Europe.
United States coin	\$250,000	.....	\$4,625,000	.....	.....	.....
Foreign coin	97,600	\$230,811	3,840	.....	.....	.....
United States assay office bars	1,553,011	33,426,440	11,003,120	\$248,144	\$253,056	.....
Bullion	5,965	9,022	1,090	856	.....	.....
In ore	277,854	.....	16,850	.....	.....	.....
Total	2,184,430	33,666,273	15,649,900	249,000	253,056	\$52,002,659

During the same period there were shipped to West Indies, Mexico, Central and South America, etc., the following, viz.:

United States coin	\$1,821,208
Foreign coin	212,332
Total	2,033,540

Grand total of exports..... 54,036,199

The imports of gold at the port of New York during the same period were as follows, viz.:

From Europe:	
United States coin	\$974,650
Foreign coin	200,626
Bullion	243,325
Total from Europe	\$1,418,601
From other ports:	
United States coin	1,272,016
Foreign coin	839,598
Bullion	1,326,660
In ore	1,241,069
Total from other ports	4,679,343
Grand total of imports	6,097,944

IMPORTS AND EXPORTS OF THE PRINCIPAL COUNTRIES OF THE
WORLD.

The imports and exports of the precious metals of the principal countries of the world during the calendar year 1901 are exhibited

in the following table. The information relating to foreign countries was received principally through representatives of the United States in them:

IMPORTS AND EXPORTS OF THE PRECIOUS METALS IN THE PRINCIPAL COUNTRIES OF THE WORLD, 1901.

GOLD.

Country.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
United States	\$54,761,880	\$57,783,939	.....	\$3,022,059
Africa ^a	1,595,959	9,713,588	.....	8,117,629
Austria-Hungary	35,731,855	7,585,763	\$28,146,102	.....
Canada	4,574,809	24,744,890	.....	20,170,081
Costa Rica	385,077	550,510	.....	165,433
Denmark	804,000	.....	804,000	.....
Egypt	14,677,469	11,971,274	2,706,195	.....
France	82,798,158	27,985,000	54,813,158	.....
Federated Malay States.....	1,870,878	875,592	995,286	.....
Germany	61,126,228	12,278,509	48,847,719	.....
Great Britain.....	104,060,588	67,961,962	36,098,626	.....
India ^b	26,952,409	20,666,059	6,286,350	.....
Italy	914,994	2,601,640	.....	1,686,646
Japan	5,308,563	5,720,562	.....	411,999
Korea	1,290	2,450,737	.....	2,449,447
Mexico.....	.....	9,758,594	.....	9,758,594
Netherlands	4,207,059	691,806	3,515,253	.....
Nicaragua .....	.....	435,000	.....	435,000
Norway	516,386	.....	516,386	.....
Siam	2,361,450	79,700	2,281,750	.....
Sweden	731,463	.....	731,463	.....
Switzerland.....	13,407,332	4,009,891	9,397,441	.....
Russia	4,459,685	34,870,237	.....	30,420,552
Portugal	1,322,387	1,355,909	.....	33,522
South American States.....	.....	.....	.....	^c 12,762,800
Australasia .....	.....	.....	.....	^c 76,880,200
China .....	.....	.....	.....	^c 9,091,500

SILVER.

United States	\$31,146,782	\$55,638,358	.....	\$24,491,576
Africa ^a	1,744,947	55,984	\$1,688,963	.....
Argentina	23,995	86,959	.....	62,964
Austria-Hungary	993,975	1,263,382	.....	269,407
Bolivia .....	.....	13,691,268	.....	13,691,268
Canada	242,215	2,136,359	.....	1,894,144
Costa Rica .....	.....	47,943	.....	47,943
Dutch Guiana	52,560	28,097	24,463	.....
Egypt	576,037	50,952	525,085	.....
France	18,885,436	27,119,395	.....	8,233,959
Federated Malay States	11,063,547	9,432,220	1,631,327	.....
Germany	4,479,537	6,981,803	.....	2,502,266
Great Britain	61,141,061	58,640,532	2,500,529	.....
India ^b	39,885,187	16,549,234	23,335,953	.....
Italy	1,430,707	1,398,994	31,713	.....
Japan	154,255	1,281,509	.....	1,127,254
Korea	450,557	100,473	350,084	.....
Mexico	2,279,875	50,269,606	.....	47,989,731
Netherlands	3,278,008	889,557	2,388,451	.....
Nicaragua	50,000	50,720	.....	720
Norway	187,264	.....	187,264	.....
Peru	6,738	983,712	.....	976,974
Siam	762,207	186,916	575,291	.....
Sweden	83,062	.....	83,062	.....
Switzerland.....	8,429,956	2,278,442	6,151,514	.....
Russia	4,818,854	1,905,930	2,912,924	.....
China	4,334,047	148,310	4,185,737	.....
Hongkong	7,623,616	3,747	7,619,869	.....
Straits Settlements.....	13,587,004	167,333	13,419,671	.....
East Africa	806,510	32,227	774,283	.....
Arabia	617,226	266,805	350,421	.....
Ceylon	2,011,280	1,154,470	956,810	.....
Persia	393,217	236,105	157,112	.....
Turkey	886,462	.....	886,462	.....

^a Annual statement of the trade of the United Kingdom with foreign countries and British possessions.

^b Fiscal year ended March 31.

^c Estimated.

VALUE OF GOLD AND SILVER IMPORTED INTO AND EXPORTED FROM THE UNITED STATES FROM AND INTO THE UNITED KINGDOM.

GOLD BULLION AND COIN.

Calendar year.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1874	\$44,261	\$21,941,783		\$21,897,522
1875	2,806,311	40,185,922		37,379,611
1876	17,150,938	21,274,902		4,123,964
1877	5,682,271	10,034,324		4,352,053
1878	4,032,112	4,216,010		183,898
1879	33,817,688	1,889,418	\$31,928,270	
1880	26,823,600	269,431	26,554,169	
1881	35,947,633	112,859	35,834,774	
1882	448,701	29,684,594		29,235,893
1883	4,562,437	47,580	4,514,857	
1884	10,627,477	21,683,345		14,055,868
1885	1,456,700	530,665	926,035	
1886	14,575,484	12,556,212	2,019,272	
1887	8,568,758	180,110	8,388,648	
1888	19,169	10,956,287		10,937,118
1889	50,125	13,608,778		13,558,653
1890	4,923,034	12,624,961		7,701,927
1891	15,391,766	37,351,283		21,959,517
1892	641,385	5,110,827		4,469,442
1893	28,796,540	20,595,062	8,201,478	
1894	1,459,590	15,799,647		14,340,057
1895	16,146,069	54,173,664		38,027,595
1896	51,236,371	15,431,560	35,804,811	
1897	5,881,000	331,195	5,549,805	
1898	53,250,031	236,011	53,014,020	
1899	6,441,786	11,577,627		5,135,841
1900	5,267,986	28,569,927		23,301,941
1901	253,301	1,283,861		1,030,560
Total	356,302,524	395,257,845	212,736,139	251,691,460
Excess		38,955,321		38,955,321

SILVER BULLION AND COIN.

1874	\$122,879	\$16,918,981		\$16,796,102
1875	43,448	15,481,341		15,437,893
1876	1,841,683	12,834,099		10,992,416
1877	1,449,682	12,730,380		11,280,698
1878	5,269,384	7,870,002		2,600,618
1879	2,989,588	12,632,115		9,642,527
1880	163,125	5,832,816		5,669,691
1881	152,531	12,644,788		12,492,257
1882	143,172	9,355,681		9,212,509
1883	236,755	13,643,442		13,406,687
1884	40,548	12,795,566		12,755,018
1885	29,253	13,648,158		13,618,905
1886	13,943	8,259,345		8,245,402
1887	172,026	10,773,185		10,601,159
1888	157,280	11,600,485		11,443,205
1889	151,591	19,348,927		19,197,336
1890	3,161,262	19,746,841		16,585,579
1891	41,755	19,387,377		19,345,622
1892	88,794	26,807,663		26,718,869
1893	14,780	35,371,119		35,356,339
1894	10,847	35,267,598		35,256,751
1895	37,054	39,335,554		39,298,500
1896	32,182	49,352,583		49,320,401
1897	70,034	49,092,031		49,021,997
1898	39,521	45,547,496		45,507,975
1899	88,994	42,929,713		42,840,719
1900	139,479	55,768,202		55,628,723
1901	350,388	47,297,479		46,947,091
Total	17,051,978	662,272,967		645,220,989
Excess		645,220,989		

The following table exhibits the value of gold and silver bullion and coin imported into and exported from the United States from and into France since 1879:

VALUE OF GOLD AND SILVER IMPORTED INTO AND EXPORTED FROM THE UNITED STATES FROM AND INTO FRANCE.

GOLD BULLION AND COIN.

Fiscal year.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1879	\$1,230,447	\$128,424	\$1,102,023	.....
1880	33,383,297	2,649	33,380,648	.....
1881	18,219,558	450	18,219,108	.....
1882	1,495,006	2,590,050	.....	\$1,095,044
1883	104,220	.....	104,220	.....
1884	3,969,915	5,015,767	.....	1,045,852
1885	3,113,347	6,300	3,107,047	.....
1886	4,427,555	11,578,912	.....	7,151,357
1887	12,433,314	37,135	12,396,179	.....
1888	9,570,658	44,166	9,526,492	.....
1889	1,558,341	23,026,482	.....	21,468,141
1890	2,353,764	5,431,373	.....	3,077,609
1891	472,850	14,659,015	.....	14,186,165
1892	15,845,817	13,061,100	2,784,717	.....
1893	5,399,599	32,240,402	.....	26,840,803
1894	10,742,507	15,450,000	.....	4,707,493
1895	7,845,583	28,625,400	.....	20,779,817
1896	3,933,491	7,534,361	.....	3,600,870
1897	16,444,810	13,989,041	2,455,769	.....
1898	22,799,157	4,016,535	18,782,622	.....
1899	10,962,144	7,000,000	3,962,144	.....
1900	638,486	14,024,240	.....	13,385,754
1901	1,404,380	21,742,600	.....	20,338,220
Total.....	188,348,246	220,204,402	105,820,969	137,677,125
Excess.....	.....	31,856,156	.....	31,856,156

SILVER BULLION AND COIN.

1879	\$259,097	\$126,666	\$132,431	.....
1880	24,274	89,431	.....	\$65,157
1881	1,267	75,850	.....	74,583
1882	21,064	810,400	.....	789,336
1883	212	1,381,214	.....	1,381,002
1884	1,635	796,788	.....	795,153
1885	919	830,115	.....	829,196
1886	146,477	585,157	.....	438,680
1887	70,139	980,713	.....	910,574
1888	227,566	601,809	.....	374,243
1889	1,906	371,850	.....	369,944
1890	1,351	134,535	.....	133,184
1891 .....	.....	399,684	.....	399,684
1892	360,433	1,412,624	.....	1,052,191
1893	1,351	462,898	.....	461,547
1894	21,595	201,000	.....	179,405
1895	5,126	1,500	3,626	.....
1896	8,133	3,435,326	.....	3,427,193
1897	2,722	1,632,866	.....	1,630,144
1898	24,718	1,062,250	.....	1,037,532
1899	4,424	2,056,408	.....	2,051,984
1900	8,288	1,021,465	.....	1,013,177
1901	5,513	1,165,961	.....	1,160,448
Total.....	1,198,210	19,636,510	136,057	18,574,357
Excess.....	.....	18,438,300	.....	18,438,300

The following table exhibits the value of gold and silver bullion and coin imported into and exported from the United States and from and into Germany since 1879.

VALUE OF GOLD AND SILVER IMPORTED INTO AND EXPORTED FROM THE UNITED STATES FROM AND INTO GERMANY.

GOLD BULLION AND COIN.

Fiscal year.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1879		\$6,600		\$6,600
1880	\$3,128,185	15,850	\$3,112,335	
1881	31,406,112	4,157	31,401,955	
1882	4,596,964	82,560	4,514,404	
1883	2,299,665	32,600	2,267,065	
1884	3,079,605	1,115,674	1,963,931	
1885	7,938,164	57,039	7,881,125	
1886	5,921,677	3,882,799	2,038,878	
1887	12,744,269	2,000,180	10,744,089	
1888	18,265,659	6,637,241	11,628,418	
1889	1,259,139	8,709,652		7,450,513
1890	1,756,884	2,297,808		540,924
1891	2,758,812	16,530,377		13,771,565
1892	3,920,742	19,308,650		15,387,308
1893	478,811	37,913,100		37,434,289
1894	14,437,867	28,811,650		14,373,783
1895	1,376,762	14,857,754		13,480,992
1896	119,016	29,020,672		28,901,656
1897	3,554,697	18,478,682		14,923,985
1898	8,428,050	1,260,840	7,167,210	
1899	190,996	3,018,000		2,827,004
1900	12,946	4,768,189		4,755,243
1901	756,332	8,408,166		7,651,834
Total.....	128,431,354	207,217,640	82,719,410	161,505,696
Excess		78,786,286		78,786,286

SILVER BULLION AND COIN.

1879	\$45,399	\$348,432		\$303,033
1880	15,465	383,830		368,365
1881	96,231	472,029		375,798
1882	296,697	649,628		352,931
1883	271,052	335,455		64,403
1884	39,194	1,914,560		1,875,366
1885	9,538	282,609		273,071
1886	34,386	99,333		64,947
1887	177,855	83,389	\$94,466	
1888	135,078	151,276		16,198
1889	19,015	575	18,440	
1890	750,633	32,712	717,921	
1891	845,901	910	844,991	
1892	91,413	107,666		16,253
1893	9,688	4,500	5,188	
1894	1,905	94,950		93,045
1895	12,328	81,317		68,989
1896	3,311	10,179		6,868
1897	12,573	17,221		4,648
1898	3,240	945	2,295	
1899	1,940	59,612		57,672
1900	5,369	17,800		12,431
1901	318	37,567		37,249
Total.....	2,878,529	5,186,495	1,683,301	3,991,267
Excess		2,307,966		2,307,966

MARKET PRICE OF SILVER DURING THE CALENDAR YEAR 1901.

Almost throughout the entire year 1901 the silver market was depressed. On January 2 the London market quotation stood at the highest point it reached during the year—29½d. per ounce—and the lowest price—24½⁵/₁₆d.—was recorded in the early part of December.

Buying for the Indian council, which had been the chief support of the market in the closing months of 1900, continued good during the first quarter of 1901, but, notwithstanding this fact, the price declined after the first three weeks of the year, during which time the metal had been steady at about 29½d. per ounce. A downward movement then began which continued throughout the year.

The Indian government was at first a large buyer, but gradually ceased purchasing until, by the end of March, the demand for rupees being for the time satisfied, buying for this quarter stopped altogether.

Speculators had held, hoping the Indian government would continue purchasing, but finding themselves mistaken they began to get rid of their holdings and the distrust of the white metal consequently increased.

China made some purchases of silver, but, on the whole, the demand from this quarter was slight. Early in the year there had been a general belief that with the improvement in the political situation of the Empire there would come a better demand for silver, but the very opposite occurred. The declaration of peace and the withdrawal of the greater part of the European forces were followed by a great accumulation of Mexican dollars at Shanghai, with the result that the stock of silver bars stood at 94½ lakhs of taels, whereas the normal amount at that season is 30 lakhs of taels. At the same time the stock of Mexican dollars was 71,250,000, as compared with an average holding of \$26,000,000.

The condition of affairs affecting these two demands was the controlling factor of the market throughout the year. In May it was rumored in London that there was a movement on foot among American smelters and refiners to regulate the output and prices, which led to buying on the part of speculators, who anticipated a strong movement, which, however, was not realized, and in addition to this, shipments to India fell off, while inquiries from other quarters were small, and American sellers were unable to dispose of their product.

The demand on the part of the British Mint for silver for coinage was also small.

In July and the following months the price held steady at 27d., and American sellers, by not forcing sales, endeavored to maintain this figure in vain, the price steadily declining until December 3, when it was 24½⁵/₁₆d., the lowest since 1897.

After the cessation of orders for India there was some demand on the part of the Straits Settlements. India took about £1,000,000 more than it had in 1900, viz, £7,500,000 against £6,500,000, while China fell off about £600,000. During August there was some demand for the Philippines, but nearly all orders stopped before the end of December.

During the year there had been a few orders for the Continent, but as a rule they were small and did not affect the London market. The weakness apparent in November had been increased by the fall of copper, the dearness of money in New York, and by the advance there of sight exchange to \$4.87½.

During the closing weeks of the year, owing to an improved Eastern demand and purchases for India and the Straits, the price recovered to 25 $\frac{3}{4}$ d., at which price it closed.

HIGHEST, LOWEST, AND AVERAGE PRICE OF SILVER BULLION AND VALUE OF A FINE OUNCE EACH MONTH DURING THE CALENDAR YEAR 1901.

Months.	High- est.	Lowest.	Average price per ounce, British standard, 0.925.	Equivalent value of a fine ounce with ex- change at par, \$4.8665.	Average monthly price at New York of ex- change on London.	Equivalent value of a fine ounce based on average monthly price and average rate of exchange.	Average monthly New York price of fine bar silver.
	<i>Pence.</i>	<i>Pence.</i>	<i>Pence.</i>				
January	29 $\frac{9}{16}$	27 $\frac{3}{8}$	28.9735	\$0.63513	\$4.8724	\$0.63582	\$0.63485
February	28 $\frac{7}{16}$	27 $\frac{7}{8}$	28.1592	.61728	4.8780	.61858	.61693
March	28 $\frac{1}{4}$	27 $\frac{5}{16}$	27.9495	.61268	4.8778	.61422	.61336
April	27 $\frac{1}{16}$	26 $\frac{1}{16}$	27.2925	.59828	4.8817	.60014	.60033
May	27 $\frac{5}{8}$	27 $\frac{3}{16}$	27.4189	.60105	4.8815	.60366	.60394
June	27 $\frac{5}{8}$	27 $\frac{1}{4}$	27.4200	.60107	4.8820	.60298	.60335
July	27 $\frac{1}{4}$	26 $\frac{1}{16}$	26.9629	.59107	4.8752	.59209	.59423
August	27 $\frac{1}{16}$	26 $\frac{3}{8}$	26.9375	.59050	4.8731	.59130	.59217
September	27	26 $\frac{7}{8}$	26.9650	.59110	4.8538	.58949	.58978
October	26 $\frac{7}{8}$	26 $\frac{3}{8}$	26.6157	.58344	4.8623	.58294	.58356
November	26 $\frac{1}{2}$	25 $\frac{3}{8}$	26.0913	.57150	4.8752	.57360	.57400
December	25 $\frac{3}{4}$	24 $\frac{1}{16}$	25.4475	.55783	4.8698	.55820	.55790
Average			27.1861	.59595	4.8731	.59691	.59703

EXPORTS OF SILVER TO THE EAST.

The exports of silver from London to India, China, and the Straits since 1881 have been as follows:

Calendar year.	India.	China.	Straits.	Total.
1881	\$12,375,612	\$3,898,860	\$3,577,729	\$19,852,201
1882	18,604,945	1,584,318	7,354,255	27,543,518
1883	18,040,140	4,212,574	11,189,631	33,442,345
1884	26,073,909	5,018,714	8,136,097	39,228,720
1885	30,913,667	3,160,215	3,108,146	37,182,128
1886	21,159,591	1,769,425	2,892,064	25,821,080
1887	19,798,328	1,427,179	2,766,946	23,992,453
1888	21,162,116	1,153,002	3,219,321	25,534,439
1889	28,392,786	2,731,861	8,181,141	39,305,788
1890	35,673,177	1,284,498	4,441,197	41,398,872
1891	21,717,992	1,177,620	10,754,800	33,650,412
1892	35,180,897	719,668	18,622,825	54,523,390
1893	34,319,877	11,635,650	7,847,295	53,802,822
1894	24,391,351	13,279,564	6,002,565	43,673,480
1895	17,638,610	8,042,003	3,668,772	29,349,385
1896	23,874,942	3,602,597	4,025,257	31,502,796
1897	28,250,305	2,721,522	3,597,331	34,569,158
1898	20,984,625	3,721,656	1,971,443	26,677,724
1899	25,597,912	6,929,117	1,396,223	33,923,252
1900	37,916,065	11,252,496	3,922,477	53,091,038
1901	36,987,395	4,101,764	3,150,680	44,239,789

IMPORTS AND EXPORTS OF BULLION INTO AND FROM LONDON.

The imports and exports of bullion into and from various countries during the calendar year, 1901, were as follows:

Countries.	Imports.		Exports.	
	Gold.	Silver.	Gold.	Silver.
Belgium	\$2, 230, 541	\$339, 029	\$160, 935	\$40, 762
France	5, 715, 914	2, 037, 336	8, 261, 769	5, 409, 908
Germany	1, 780, 614	1, 370, 918	16, 139, 922	1, 163, 137
Holland	575, 751	254, 202	1, 156, 572	113, 925
Sweden and Denmark	11, 699	224	1, 126, 595	1, 222
Russia				301, 772
Spain, Portugal, etc	1, 566, 390	138, 759		200, 426
Gibraltar	74, 253	8, 599	58, 398	706
Malta	84, 483		492, 003	97, 330
Egypt			816, 307	190, 801
Alexandria	5, 591, 073	301, 139		
Mauritius				
Aden				
Ceylon				
Bombay				
Madras	33, 804, 334	4, 701	11, 914, 657	37, 699, 671
Caleutta				
Singapore				
Penang				
Manila				
Hongkong	1, 294, 791	2, 433		6, 188, 465
Shanghai				
Japan	83, 120	1, 270	486, 650	97, 330
Cape Verde, Sierra Leone, etc	180, 387	476, 752	134, 914	842, 435
Natal, Transvaal	9, 549, 445	26, 829	1, 461, 045	902, 512
Cape of Good Hope				
United States	1, 283, 861	47, 297, 479	253, 301	350, 388
Mexico, South America (except Brazil), West Indies, etc	5, 162, 150	2, 613, 816	8, 221, 738	616, 225
Brazil	2, 237, 160	1, 071	2, 072, 818	584
British North America				155, 426
Australia	23, 467, 343	714, 874		915, 632
New Zealand	3, 623, 119	226, 171		24, 333
Other countries	2, 496, 174	157, 314	15, 204, 338	3, 327, 542
Total	100, 812, 602	55, 972, 916	67, 961, 962	58, 640, 532

VALUE OF NET IMPORTS OF SILVER INTO INDIA SINCE 1835.

The net imports in value of silver into India, average exchange rate of India rupee in London, and amount of council bills sold, by fiscal years ended March 31, is shown by the following table:

Year.	Net imports of silver.	Average rate of Indian rupee.	Amount of council bills sold.	Year.	Net imports of silver.	Average rate of Indian rupee.	Amount of council bills sold.
		<i>Pence.</i>				<i>Pence.</i>	
1835-36	a16, 118, 960		\$9, 953, 224	1852-53	\$22, 293, 629	23 ⁷ / ₈	\$16, 152, 235
1836-37	\$6, 176, 311	22 ¹ / ₂	9, 938, 522	1853-54	11, 279, 345	24 ¹ / ₂	18, 738, 775
1837-38	9, 173, 294	23	8, 303, 149	1854-55	138, 797	23 ¹ / ₂	17, 860, 191
1838-39	12, 671, 392	23 ³ / ₈	11, 419, 685	1855-56	40, 085, 623	24 ¹ / ₄	7, 222, 081
1839-40	7, 864, 683	23 ¹ / ₂	7, 005, 448	1856-57	56, 413, 954	25 ¹ / ₂	13, 722, 119
1840-41	6, 679, 118	23 ¹ / ₂	5, 715, 461	1857-58	61, 012, 039	24 ³ / ₈	3, 059, 077
1841-42	5, 887, 052	22 ³ / ₈	12, 600, 746	1858-59	a 77, 283, 420	(b)	124, 451
1842-43	14, 068, 739	23 ¹ / ₂	5, 827, 332	1859-60	a 111, 475, 630	(b)	22, 813
1843-44	17, 237, 334	23	13, 634, 624	1860-61	a 53, 280, 090	(b)	3, 879
1844-45	8, 719, 684	21 ¹ / ₈	12, 248, 742	1861-62	\$43, 988, 930	23 ⁷ / ₈	5, 809, 277
1845-46	4, 112, 529	21 ¹ / ₂	14, 919, 273	1862-63	60, 757, 238	23 ¹ / ₂	32, 321, 230
1846-47	6, 322, 979	22 ³ / ₈	15, 071, 750	1863-64	61, 950, 883	23 ⁷ / ₈	43, 698, 839
1847-48	2, 204, 565	22	7, 503, 189	1864-65	48, 793, 010	23 ¹ / ₂	33, 040, 970
1848-49	1, 344, 618	21 ¹ / ₈	9, 193, 767	1865-66	89, 904, 731	23 ¹ / ₄	33, 900, 604
1849-50	5, 810, 633	22 ¹ / ₂	14, 283, 752	1866-67 ^c	32, 474, 026	23	24, 661, 422
1850-51	10, 410, 803	24 ¹ / ₂	15, 750, 223	1867-68	26, 230, 510	23 ¹ / ₂	20, 134, 097
1851-52	14, 016, 886	24 ¹ / ₂	13, 516, 816	1868-69	40, 330, 842	23 ¹ / ₂	18, 033, 989

a Rupees.
b From 1858-59 to 1860-61, inclusive, the home treasury was open at all times for the sale of bills on India, at rates altered from time to time by advertisement. Consequent on the mutiny, it was necessary to refrain from drawing on India, and exchange was raised to a prohibitory rate.
c Eleven months

Year.	Net imports of silver.	Average rate of Indian rupee.	Amount of council bills sold.	Year.	Net imports of silver.	Average rate of Indian rupee.	Amount of council bills sold.
		<i>Pence.</i>				<i>Pence.</i>	
1869-70	\$34,500,818	23½	\$33,968,764	1886-87	\$25,306,454	17.441	\$59,061,202
1870-71	4,273,507	22½	41,090,337	1887-88	31,623,459	16.899	74,742,515
1871-72	30,574,254	23½	50,175,265	1888-89	30,709,917	16.379	69,410,203
1872-73	3,298,985	22½	67,834,606	1889-90	36,741,437	16.566	75,306,635
1873-74	11,311,401	22.351	64,654,752	1890-91	51,993,287	18.089	77,713,304
1874-75	20,916,698	22.221	52,760,715	1891-92	30,611,949	16.733	78,320,740
1875-76	6,826,414	21.645	60,294,052	1892-93	39,083,615	14.984	80,454,024
1876-77	29,911,149	20.491	61,784,106	1893-94	40,466,665	14.546	46,378,884
1877-78	61,869,640	20.79	49,319,325	1894-95	16,812,318	13.100	82,268,679
1878-79	15,910,390	19.761	67,880,692	1895-96	18,206,409	13.641	85,278,507
1879-80	31,852,848	19.961	74,271,598	1896-97	17,163,165	14.454	76,028,915
1880-81	15,751,280	19.956	74,163,888	1897-98	26,447,429	15.393	44,271,918
1881-82	21,699,764	19.895	89,604,086	1898-99	16,442,585	15.979	91,064,157
1882-83	29,614,971	19.525	73,584,015	1899-1900	11,653,240	16.068	92,495,079
1883-84	25,372,923	19.536	85,649,451	1900-1901	30,792,023	15.973	65,501,810
1884-85	28,367,364	19.308	66,957,731	1901-2	23,318,450	15.988	89,444,377
1885-86	42,960,530	18.254	50,089,386				

GOLD AND SILVER IMPORTED INTO AND EXPORTED FROM BRITISH INDIA IN EACH FISCAL YEAR ENDING MARCH 31, FROM 1873-74 (BRITISH STANDARD OUNCES).

[From Financial and Commercial Statistics of British India.]

Period.	Gold.			Silver.		
	Imported.	Exported.	Net im- ports.	Imported.	Exported.	Net im- ports.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
1873-74			331,554			8,747,151
1874-75			446,964			16,269,590
1875-76			355,985			5,451,074
1876-77			62,696			25,229,986
1877-78			102,628			51,436,354
1878-79			177,101			13,916,146
1879-80			374,227			27,581,194
1880-81			777,533			13,642,358
1881-82			1,028,240			18,852,031
1882-83			1,048,810			26,216,055
1883-84			1,138,584			22,448,221
1884-85			973,053			25,393,863
1885-86			544,437			40,677,913
1886-87			393,174			25,078,814
1887-88	569,684	41,646	528,038	37,877,141	5,094,542	32,782,599
1888-89	512,287	50,710	461,577	37,844,665	5,408,636	32,436,029
1889-90	850,232	76,848	773,384	43,940,659	5,296,885	38,643,774
1890-91	1,175,875	161,646	1,014,229	56,190,870	4,661,785	51,529,085
1891-92	709,102	285,454	423,648	38,177,580	5,829,142	32,348,438
1892-93	272,442	726,925	—454,483	54,180,144	8,656,632	45,523,512
1893-94	474,635	378,399	96,236	60,328,296	5,999,323	54,328,973
1894-95	236,873	926,843	—689,970	32,638,069	5,598,047	27,040,022
1895-96	695,055	372,432	322,623	34,082,810	7,064,731	27,018,079
1896-97	657,238	347,873	309,365	37,520,322	11,591,234	25,929,088
1897-98	1,129,149	397,114	732,035	68,535,612	24,250,995	44,284,617
1898-99	1,432,461	410,461	1,022,000	49,226,780	26,061,355	23,165,425
1899-1900	1,914,037	353,225	1,560,812	50,663,542	32,017,260	18,646,282
1900-1901	1,987,738	1,881,060	106,678	64,746,549	15,311,385	49,435,164
1901-2	1,372,249	1,097,743	274,506	66,726,972	27,721,780	39,005,192

NOTE.—The quantities in the column "net imports" for both gold and silver, for the years 1873-74 to 1886-87 are estimated only, deduced from the declared values of the trade for those years by the following process:

For gold, the rupee value of the monthly net imports was converted into sterling at the average rate of exchange in each month, and this sterling value was then divided by the English mint price of gold (£3 17s. 10½d.). For silver the average price of 107 rupees per 100 tolas, or 285.33 rupees per 100 ounces, was taken as the basis of the value of the annual imports.

STOCK OF MONEY IN THE UNITED STATES.

The stock of United States coin in the United States on December 31, 1901, was as follows:

OFFICIAL TABLE OF STOCK OF COIN IN THE UNITED STATES DECEMBER 31, 1901.

Items.	Gold.	Silver.	Total.
Estimated stoek of coin December 31, 1900	\$957, 730, 728	\$595, 163, 828	\$1, 552, 894, 556
Coinage calendar year 1901.....	101, 735, 188	30, 838, 461	132, 573, 649
Net imports of United States coin, ealendar year 1901.....		43, 004	43, 004
Total	1, 059, 465, 916	626, 045, 293	1, 685, 511, 209
Loss:			
Net exports of United States coin, ealendar year 1901.....	4, 959, 073	-----	4, 959, 073
United States coin melted for recoinage, ealendar year 1901.....	1, 581, 457	3, 457, 521	5, 038, 978
United States coin taken out in war ships and transports for disbursements in Cuba, Porto Rico, and the Philippine Islands, not recorded at the eustom-houses, ealendar year 1901.....	600, 000	^a 199, 550	799, 550
United States coin used in the arts, ealendar year 1901.....	1, 500, 000	100, 000	1, 600, 000
Total	8, 640, 530	3, 757, 071	12, 397, 601
Estimated stoek of coin, December 31, 1901.....	1, 050, 825, 386	622, 288, 222	1, 673, 113, 608

^a Of this amount \$60,000 were in standard silver dollars.

NOTE.—The number of standard silver dollars coined to December 31, 1901, is 532,955,428, which, added to the Hawaiian dollar coinage of 500,000, gives a total of 533,455,428.
Since July 1, 1898, the number of standard silver dollars exported has been 2,495,000, and since 1883 the number withdrawn from eirculation and melted has been 175,811 (Report of the Director of the Mint, 1901, p. 16), a total disposition of 2,670,811, leaving in the United States on December 31, 1901, a net stoek of 530,784,617 standard silver dollars and \$91,503,605 in subsidiary silver coin.

In the above table under the item “United States coin melted for recoinage,” the amounts represent nominal or face value.

In the appendix a table will be found giving in detail the source from which these amounts were obtained.

On December 31, 1901, the cost value of the gold and silver bullion owned by the Government was as follows:

GOLD AND SILVER BULLION IN MINTS AND ASSAY OFFICES DECEMBER 31, 1901.

Metal.	Value.
Gold.....	\$123, 735, 775
Silver (eost).....	42, 653, 999
Total	166, 389, 774

On December 31, 1901, the Mercantile Safe Deposit Company, in New York City, had on deposit in its vaults 31,336 ounces, fine, of silver bullion of the commercial value of \$17,700, which, added to the stock of bullion owned by the Government and the stock of coin in the United States, shows a total metallic stock as follows:

METALLIC STOCK DECEMBER 31, 1901.

Bullion and coin.	Value.
Gold.....	\$1, 174, 561, 161
Silver (including amount held by Mereantile Safe Deposit Co.)	664, 959, 921
Total	1, 839, 521, 082

The metallic stock on hand December 31, 1900, was as follows:

METALLIC STOCK DECEMBER 31, 1900.

Bullion and coin.	Value.
Gold	\$1, 110, 825, 600
Silver (including amount held by Mercantile Safe Deposit Co.)	655, 798, 756
Total	1, 766, 624, 356

The increase during the calendar year in the stock of gold was \$63,735,561, and silver \$9,161,165, a total increase of \$72,896,726.

The stock of metallic and paper money in the United States on December 31, 1901, was located as follows:

LOCATION OF THE MONEYS OF THE UNITED STATES, DECEMBER 31, 1901.

Moneys.	In Treasury.	Outside of Treasury.	Total.
Metallic:			
Gold bullion	\$123, 735, 775	.....	\$123, 735, 775
Silver bullion	42, 653, 999	\$17, 700	.....
Gold coin	417, 343, 064	633, 482, 322	1, 050, 825, 386
Silver dollars.....	457, 599, 143	73, 185, 474	530, 784, 617
Subsidiary silver coin.....	6, 640, 976	84, 862, 629	91, 503, 605
Total metallic.....	1, 047, 972, 957	791, 548, 125	1, 796, 849, 383
Paper:			
Legal-tender notes (old issue)	6, 843, 496	339, 837, 520	346, 681, 016
Legal-tender notes (act July 14, 1890)	220, 641	38, 375, 359	38, 596, 000
National-bank notes	10, 311, 017	349, 978, 710	360, 289, 727
Total notes.....	17, 375, 154	728, 191, 589	745, 566, 743
Gold certificates.....	38, 254, 020	278, 781, 069	.....
Silver certificates	6, 730, 175	449, 356, 825	.....
Total certificates	44, 984, 195	728, 137, 894	.....
Grand total.....	.....	2, 247, 877, 608	2, 542, 416, 126

GOLD AND SILVER USED IN INDUSTRIAL ARTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1901.

The problem of industrial consumption of the precious metals has been the subject of special inquiry conducted by this Bureau for several years past and is reserved for fuller treatment in my forthcoming report for the fiscal year ended June 30, 1902. A summary of the principal statements showing the quantity and value of precious metals used in industrial arts in the United States during the calendar year 1901 is submitted below.

Among the purveyors of gold and silver bars for use in the industrial arts the United States mint at Philadelphia and the United States assay office at New York hold the foremost places, which brings the larger portion of the total material consumed in the arts under Government notice as a matter of public record.

The quantity and value of the bars issued by the United States mints at Philadelphia and New Orleans, and the assay office at New York, during the calendar year 1901, is given in the following table:

STATEMENT OF GOLD AND SILVER BARS ISSUED FOR USE IN THE INDUSTRIAL ARTS BY THE GOVERNMENT INSTITUTIONS DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1901.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	734,130.980	\$15,175,834.20	1,301,270.62	\$1,682,450.91
Old jewelry, etc.	110,592.886	2,286,157.89	521,586.53	674,374.50
Foreign material	33,167.926	685,641.86	1,037,599.20	1,341,542.39
United States coin	820.695	16,965.29		
Total.....	878,712.487	18,164,599.24	2,860,456.35	3,698,367.80

The United States coin reported by the Government institutions in the above table as having been used in the manufacture of bars for industrial use is either abraded or mutilated.

The following table shows the percentage of material used in the manufacture of bars at the Government institutions:

UNITED STATES BARS.

Material used.	Gold.	Silver.
	<i>Per cent.</i>	<i>Per cent.</i>
Domestic bullion	83.5	45.5
Old jewelry, etc.	12.6	18.2
Foreign material	3.8	36.3
United States coin .....	.1	
Total.....	100	100

The percentage in the above table shows that the total domestic gold bullion used for industrial purposes was 83.5 per cent of the entire amount used; old jewelry, 12.6 per cent; foreign material, 3.8 per cent, and United States coin only 0.1 of 1 per cent.

In the silver consumption, domestic bullion was 45.5 per cent; old jewelry, 18.2 per cent, and foreign material 36.3 per cent. There was no domestic silver coin used by the Government institutions.

The quantity and value of the bars manufactured by private refineries in the United States and sold to manufacturers and jewelers during the calendar year 1901 was as follows:

BARs FOR INDUSTRIAL USE FURNISHED GOLDSMITHS AND OTHERS BY PRIVATE REFINERIES DURING THE CALENDAR YEAR 1901.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion exclusive of United States bars	54,221	\$1,120,854	10,508,147	\$13,586,291
United States bars	155,381	3,212,015	391,628	506,348
United States coin	18,372	379,774	600	776
Foreign material			811	1,048
Old plate, jewelry, and other old material	53,235	1,100,468	686,936	888,160
Total.....	281,209	5,813,111	11,588,122	14,982,623

The number of firms addressed was 109. There were 90 replies, of which 52 manufactured bars and 38 reported as not having manufactured bars during the year.

Of the bars furnished by private refineries for industrial use, \$3,212,015 in gold and \$506,348 (coining value) in silver were "United States bars," that is, bars bearing the stamp of Government institutions, and, in order to avoid duplication, these amounts are deducted from the totals.

The quantity and value of bars sold manufacturers and jewelers by the private refineries, after eliminating the "United States bars," was as follows:

BARS FOR INDUSTRIAL USE FURNISHED GOLDSMITHS AND OTHERS BY PRIVATE REFINERIES DURING THE CALENDAR YEAR 1901.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	54,221	\$1,120,854	10,508,147	\$13,586,291
United States coin	18,372	379,774	600	776
Foreign material			811	1,048
Old plate, jewelry, and other old material ...	53,235	1,100,468	686,936	888,160
Total.....	125,828	2,601,096	11,196,494	14,476,275

The following table shows the percentage of the different materials used by the private refineries in the manufacture of bars:

Material used.	Gold.	Silver.
	<i>Per cent.</i>	<i>Per cent.</i>
Domestic bullion	43.1	93.9
Old material	42.3	6.1
United States coin	14.6	
Foreign material		
Total.....	100	100

The above figures show that the domestic bullion, both gold and silver, of the same year's production has the largest percentage of material used. In the case of gold the percentage of old material used almost equaled that of the domestic bullion.

The total consumption of the precious metals—obtained by adding the amounts sold by Government institutions to that of the private refineries—during the year was as follows:

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND ARTS DURING THE CALENDAR YEAR 1901.

Material used.	Gold.	Silver (coining value).	Total.
Domestic bullion.....	\$16,296,688	\$15,268,742	\$31,565,430
United States coin.....	396,739	776	397,515
Foreign material.....	685,642	1,342,590	2,028,232
Old material	3,386,626	1,562,535	4,949,161
Total.....	20,765,695	18,174,643	38,940,338

PERCENTAGE RATES OF GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND ARTS DURING THE CALENDAR YEAR 1901.

Material used.	Gold.	Silver.
Domestic bullion	78.5	84.0
United States coin	1.9	.....
Foreign material	3.3	7.4
Old material.....	16.3	8.6
Total.....	100	100

The above percentage table shows that 78.5 per cent of all the gold and 84 per cent of all the silver used in the United States for industrial purposes was from domestic bullion.

To obtain the total quantity of gold and silver used in the industrial arts a further allowance must be made for United States coin melted by goldsmiths and jewelers.

Estimating for the present, as in former years, the total amount of gold coin used in the arts at \$1,500,000, and silver coin at \$100,000, the industrial consumption of the precious metals in the United States during the calendar year 1901 would be as follows:

INDUSTRIAL CONSUMPTION OF THE PRECIOUS METALS DURING THE CALENDAR YEAR 1901.

Material used.	Gold.	Silver (coin- ing value).	Total.
Domestic bullion.....	\$16,296,688	\$15,268,742	\$31,565,430
United States coin	1,500,000	100,000	1,600,000
Foreign material.....	685,642	1,342,590	2,028,232
Old material	3,386,626	1,562,535	4,949,161
Total	21,868,956	18,273,867	40,142,823

The following table exhibits the aggregate value of all gold bars furnished by the United States mint at Philadelphia and assay office at New York to the trade, in exchange for gold coin, under the provisions of the act of May 26, 1882:

GOLD BARS EXCHANGED FOR GOLD COIN AT THE MINT AT PHILADELPHIA AND ASSAY OFFICE AT NEW YORK DURING THE CALENDAR YEAR 1901.

Month.	Philadelphia.	New York.	Total.
1901.			
January	\$282,439.56	\$8,869,803.50	\$9,152,243.06
February.....	275,649.64	780,525.77	1,056,175.41
March.....	211,481.91	997,976.19	1,209,458.10
April.....	274,729.44	5,561,817.35	5,836,546.79
May.....	268,539.00	10,077,346.28	10,345,885.28
June.....	196,572.71	3,060,884.49	3,257,457.20
July.....	202,044.74	2,091,727.20	2,293,771.94
August.....	258,986.14	936,818.96	1,195,805.10
September.....	241,409.85	1,022,798.22	1,264,208.07
October.....	289,731.06	4,161,964.00	4,451,695.06
November.....	263,981.80	15,928,260.02	16,192,241.82
December.....	162,233.27	3,410,120.81	3,572,354.08
Total	2,927,799.12	56,900,042.79	59,827,841.91

These figures include both small bars manufactured for use in the arts and large bars manufactured for export. The total amount was distributed as follows:

Exported	\$46,483,772.03
Employed for industrial purposes	13,344,069.88
Total	59,827,841.91

The following table shows the amounts and the classification of gold and silver used in the industrial arts in the United States each year since 1880:

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS, AND CLASSIFICATION OF THE MATERIAL USED, BY CALENDAR YEARS, SINCE 1880.

GOLD.

Calendar year.	United States coin.	New material.	Old material.	Foreign bullion and coin.	Total.
1880.....	\$3,300,000	\$6,000,000	\$395,000	\$1,267,600	\$10,962,600
1881.....	2,700,000	7,000,000	522,900	1,547,800	11,770,700
1882.....	2,500,000	7,000,000	696,500	671,500	10,868,000
1883.....	4,875,000	7,840,000	1,549,300	194,500	14,458,800
1884.....	5,000,000	6,000,000	3,114,500	385,500	14,500,000
1885.....	3,500,000	6,736,927	1,408,902	178,913	11,824,742
1886.....	3,500,000	7,003,480	1,928,046	638,003	13,069,529
1887.....	3,500,000	9,090,342	1,835,882	384,122	14,810,346
1888.....	3,500,000	9,893,057	2,402,976	718,809	16,514,842
1889.....	3,500,000	9,686,827	3,218,971	291,258	16,697,056
1890.....	3,500,000	10,717,472	3,076,426	362,062	17,655,960
1891.....	3,500,000	10,697,679	4,860,712	628,525	19,686,916
1892.....	3,500,000	10,588,703	4,468,685	771,686	19,329,074
1893.....	1,500,000	8,354,482	2,777,165	804,254	13,435,901
1894.....	1,500,000	6,430,073	2,184,946	543,585	10,658,604
1895.....	1,500,000	8,481,789	2,976,269	471,027	13,429,085
1896.....	1,500,000	7,209,787	2,369,343	316,804	11,395,934
1897.....	1,500,000	7,184,822	2,571,428	613,981	11,870,231
1898.....	1,500,000	9,463,262	2,164,976	437,641	13,565,879
1899.....	1,500,000	13,267,287	2,734,985	344,906	17,847,178
1900.....	1,500,000	14,582,627	3,480,612	584,903	20,148,142
1901.....	1,500,000	16,296,688	3,386,626	685,642	21,868,956
Total	59,875,000	199,525,304	54,125,150	12,843,021	326,368,475

SILVER (COINING VALUE).

1880.....	\$600,000	\$5,000,000	\$145,000	\$353,000	\$6,098,000
1881.....	200,000	5,900,000	178,000	371,000	6,649,000
1882.....	200,000	6,344,300	212,900	440,300	7,197,500
1883.....	200,000	4,623,700	561,900	155,000	5,540,600
1884.....	200,000	4,500,000	170,000	650,000	5,520,000
1885.....	200,000	4,539,875	462,186	62,708	5,264,769
1886.....	200,000	3,626,195	404,155	825,615	5,055,965
1887.....	200,000	4,102,734	450,606	654,991	5,438,331
1888.....	200,000	6,477,857	652,047	771,985	8,101,889
1889.....	200,000	7,297,933	611,015	657,997	8,766,945
1890.....	200,000	7,143,635	640,100	1,245,419	9,229,154
1891.....	200,000	7,289,073	858,126	1,256,101	9,603,300
1892.....	200,000	7,204,210	647,377	1,249,801	9,301,388
1893.....	100,000	6,570,737	1,222,836	1,740,704	9,634,277
1894.....	100,000	8,579,472	1,221,177	982,399	10,883,048
1895.....	100,000	9,825,387	1,378,136	973,501	12,277,024
1896.....	100,000	7,965,449	1,076,829	1,061,995	10,204,273
1897.....	100,000	9,200,497	1,103,460	797,193	11,201,150
1898.....	100,000	10,176,784	949,312	632,449	11,858,545
1899.....	100,000	12,845,942	2,047,584	684,137	15,677,663
1900.....	100,000	13,476,829	2,296,250	1,215,935	17,089,014
1901.....	100,000	15,268,742	1,562,535	1,342,590	18,273,867
Total	3,900,000	167,959,351	18,881,531	18,124,820	208,865,702

THE WORLD'S INDUSTRIAL CONSUMPTION.

Since 1893 this Bureau has endeavored to obtain, through the United States representatives abroad, official estimates from the various countries of the world of the consumption of precious metals in the arts and industries.

The results of these inquiries, though at times incomplete, are considered sufficiently full and accurate to encourage renewed efforts.

The interrogatories sent out by this Bureau for 1901 were as follows:

(4) What was the weight of fine gold used in the industrial arts during the calendar year 1901?

(5) What amount of this was new gold, what amount old gold, and what amount coins?

(6) What was the weight of fine silver used in the industrial arts during the calendar year 1901?

(7) What amount of this was new silver, what amount old silver, and what amount coins?

The following verbatim replies of all countries as to their consumption of precious metals in the arts during 1901 is submitted, together with such other matter relative to the question as was assumed to be of value:

From Argentina.—"Not ascertainable, as there are no statistics on the subject."

From Australasia.—Victoria: Not ascertainable. Queensland: No information available. Tasmania: There are no means of ascertaining; the quantity of gold and silver used would be very small. No coin is used. New Zealand: The registrar is unable to give any information.

From Austria.—(4) Articles of gold, gold wire, and jewelry brought to the Imperial assay office to be stamped during the year 1901 show the domestic consumption of gold to have been as follows:

Description.	Gross weight.	At the average standard of 1900.	In fine gold.
	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>
Domestic articles of gold	5,142.532	582.144	2,993.694
Domestic, double (plated) wares (that is, the gold placed on same—2.5 per cent of)	122.770	.....	=3.069
Wire (that is, the gold placed on same—1.7 per cent of)	1,846.390	.....	=31.388
Total			3,028.151

No data are at hand to show the amount of gold consumed during the year for other industrial uses, especially in gilding by fire and galvanism. In the year 1900 there were consumed 593.231 kilograms.

(5) Assuming that 27 per cent of the articles of gold stamped during the year 1901 were manufactured from old articles of gold, there were used in the year 1901:

	Kilograms, fine.
New gold.....	2,210.550
Old gold.....	817.601

(6) The articles brought to the Imperial assay office at Vienna during the year 1901 to be stamped show the domestic consumption of silver to have been as follows.

Description.	Gross weight.	At the aver- age standard of 1900.	In fine silver.
	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>
Domestic articles of silver.....	54,492.835	794.804	43,311.123
Wire.....			2,562.212
Total			45,873.335

No data are obtainable showing the amount of silver consumed during the year 1901 for other industrial uses. During the year 1900 there were consumed 10,355.523 kilograms.

Assuming that 20 per cent of the silver stamped during the year 1901 was manufactured from old articles of silver, there were used in the year 1901:

	Kilograms, fine.
New silver.....	36,697.868
Old silver.....	9,174.467

From Hungary.—(4, 5, 6, and 7) No data are at hand showing the amount of gold and silver used for industrial purposes. There were presented at the Royal Hungarian Assay Office for the purpose of being officially stamped:

	Kilograms.
A.— <i>Domestic goods.</i>	
(1) Gold ware	1,337.068
(2) Silverware	8,728.476
(3) Gilt wire	315.852
(4) Silver wire.....	266.540

	Kilograms.
B.— <i>Foreign goods.</i>	
(1) Different gold ware.....	158.445
(2) Different silverware	1,295.923
(3) Gold watches	142.184
(4) Silver watches	1,371.662

In the coinage of medals were used 1.9124 kilograms fine gold and 1.9737 kilograms fine silver.

From Bolivia.—No information.

From Brazil.—No data obtainable.

From British India.—(4, 5) There are no data from which to make an estimate, except that it may be said that all the uncoined gold imported is manufactured into plate and ornaments. All the gold produced in India is exported to London.

(6, 7) Estimate of the quantity of silver annually employed in industry: Until the closure of the Indian mints in June, 1893, practically all the silver imported into India (none is produced in the country) was coined either in the mints of the government or in those of the native states. Much of the coin was withdrawn annually from circulation to be hoarded or converted into ornaments, but there are no data except the imports of silver during the period since the closure of the government mints on which to frame an estimate of the quantity actually so withdrawn. The import trade in silver was materially influenced for a period by speculation arising out of the special and transitory conditions which followed the closure of the mints, and the two famines of 1896–97 and 1899–1900 have also specially affected the imports, which therefore still form an uncertain basis on which to frame an estimate. It is also impossible to say what proportion of the

imported silver is hoarded in the form of rupees, bars, or ingots, and what proportion is manufactured into ornaments and plate.

From Canada.—Unable to secure any information.

From Central America.—Question disregarded.

From Costa Rica.—No means of knowing.

From Denmark.—Minister of finance unable to give any information.

From Ecuador.—Practically none.

From Egypt.—No means of knowing; no information kept.

From Finland.—During 1900 the weight of hall-marked articles manufactured of gold was 195,027 grams; and of silver, 1,937,233 grams; in both cases a considerable increase over 1899. The value of the manufactured articles of gold and silver in 1900 was 1,240,000 Finnish marks, or \$239,320. The consumption of gold in the industrial arts—based upon reports of the assay office—from 1827 to 1900, inclusive, amounts to 3,609,528 grams, and of silver, 44,855,383 grams.

From France.—(4,5) About 27,000 kilograms of fine gold. No information as to what amount of this was new or old gold.

NOTE.—Weight of the gold ware stamped at the “Bureau de Garantie” at the mint during the year 1901 was 11,450 kilograms.

(6,7) Weight of fine silver used in the industrial arts during the calendar year 1901, about 237,000 kilograms. No information as to what amount of this was new or old silver.

NOTE.—The amount of silverware, etc., stamped at the “Bureau de Garantie” at the mint during the year 1901, was 134,000 kilograms.

From Guiana (Dutch).—No statistics are compiled.

From Germany.—No statistics are obtainable for any years subsequent to 1897.

From Great Britain.—No information available.

The Bureau of the Mint has received no official information as to the industrial gold consumption of England in 1901, and recourse is therefore had, as last year, to an estimate of the same. According to the memorandum by Mr. W. Chandler Roberts-Austen, chemist and assayer, published in the reports of the deputy master of the royal mint, London, the number of ounces of gold wares assayed and marked by the wardens of the assay offices at Birmingham and Chester annually from 1889 was as follows:

Year.	Birmingham.	Chester.	Total.
	<i>Troy ozs.</i>	<i>Troy ozs.</i>	<i>Troy ozs.</i>
1889.....	158,769	41,883	200,652
1890.....	193,426	51,166	244,592
1891.....	230,136	53,715	283,851
1892.....	228,018	55,789	283,807
1893.....	229,016	61,318	290,334
1894.....	223,759	62,442	286,201
1895.....	239,472	73,283	312,755
1896.....	283,423	97,281	380,704
1897.....	311,335	109,187	420,522
1898.....	333,741	130,480	464,221
1899.....	362,481	148,895	511,376
1900.....	371,433	164,958	536,391
1901.....	407,698	173,631	581,329

These figures are far from representing the total industrial gold consumption of the United Kingdom, which must, if we are to be guided by earlier estimates, be placed at, at least, twice these amounts.

Professor Lexis estimated it to have been, in 1895, 500,000 ounces, or about 15,500 kilograms, net, or, in other words, that the wares stamped represented approximately 60 per cent of the actual con-

sumption of fine gold in the industrial arts. Assuming that the ratio between the amount of the stamped and the unstamped wares to have remained constant, this Bureau estimates that 926,242 ounces, or 28,810 kilograms, of fine gold were consumed in Great Britain in the industrial arts during 1901.

No official estimate for silver has been received, and hence the report of Mr. Roberts-Austen of the amounts stamped at the assay office is given:

Year.	Birming- ham.	Sheffield.	Chester.	Total.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
1894	1,401,449	496,148	227,250	2,124,847
1895	1,796,056	715,248	311,624	2,822,928
1896	2,117,622	922,482	473,887	3,513,991
1897	2,303,157	974,477	556,801	3,834,435
1898	2,530,019	1,165,017	592,783	4,287,819
1899	2,823,525	1,323,917	741,044	4,888,486
1900	2,957,679	1,252,688	889,953	5,100,320
1901	3,272,950	1,307,370	965,166	5,545,486

Professor Lexis estimated the net silver consumption of England in 1895 at 140,000 kilograms, or in other words, that the wares stamped represented approximately 60 per cent of the actual consumption of fine silver in the arts. Consequently, this Bureau, assuming that the ratio between the stamped and the unstamped wares remained constant, estimates the amount used in this manner in 1901 at 8,840,313 ounces, or 275,022 kilograms.

From Greece.—Impossible to ascertain.

From Haiti.—None.

From Japan.—Unknown.

From Korea.—No statistics available.

From Norway.—No information can be given.

From Mexico.—Not known.

From the Netherlands.—(4) It is estimated that 656 kilograms of fine gold were used in the industrial arts in 1901.

(5) The amount of silver consumed in the industrial arts in 1901 amounted to 12,415 fine kilograms.

From Nicaragua.—Only small quantities used by goldsmiths, bought up little by little as they require it; nearly all the gold used is coin and old gold; all the silver used is coin and old silver.

From Persia.—(4-7) In default of statistics, these questions admit of no definite and satisfactory answer, but in comparison with the population of the country and the general wealth, the average would be considerable. Persians, like other Orientals, have a great liking for trinkets and other personal adornments.

From Peru.—(4-7) It is impossible to give the weight of fine silver and gold used in the industrial arts, as no statistics are compiled in Peru regarding this form of consumption.

From Portugal.—(4) The fine gold used in the arts (by goldsmiths) amounted in 1901, approximately, to 2,000 kilograms.

(5) The fine silver used in the arts (by silversmiths) amounted in 1900, approximately, to 9,500 kilograms.

(6) The mint does not possess the information required to answer these questions.

From Russia.—No answer to questions.

From San Salvador.—(4) Estimated, 1,000 ounces.

(6) Estimated, 450 pounds.

(5-7) No statistics available.

From Santo Domingo.—(4-7) None.

From Servia.—(6, 7) No information.

From Siam.—(4-7) No figures.

From Straits Settlements.—None.

From Sweden.—(4) At least 600 fine kilograms of gold are used annually for industrial purposes, but the quantity can not be stated exactly.

(5) It is impossible to say what amount of this was new gold, old gold, or gold coin.

(6, 7) At least 6,000 kilograms of fine silver are used annually for industrial purposes, but the quantity can not be stated exactly. It is impossible to say what amount of this was new silver, old silver, or silver coin.

From Switzerland.—(4) The total weight of fine gold used in the industrial arts in Switzerland during the year 1901, amounted to about 10,450 kilograms, valued at 36,000,000 francs.

(5) Of this quantity, about 6,300 kilograms—21,700,000 francs—were new gold and about 4,150 kilograms—14,300,000 francs—were old gold. The coins melted down are included in the new gold; the exact proportion of these can not be specified.

(6) The total weight of silver used in the industrial arts in Switzerland during the year 1901 amounted to about 90,000 kilograms, valued at 9,000,000 francs, according to the present value of silver.

(7) Of this quantity, 70,000 kilograms, equal to about 7,000,000 francs, were new silver and about 20,000 kilograms, equal to 2,000,000 francs, were old silver. It is needless to say that, on account of the loss which would result from melting silver coins, none of the above is derived from this source.

From Uruguay.—No information.

For other countries.—For other countries the consumption of gold is estimated at 5,000 kilograms—following previous estimates of this Bureau—and of silver at 50,000 kilograms, being Dr. Soetbeer's estimate in 1885, with 25 per cent added.

The following table of the world's industrial consumption was compiled from the above returns, the figures for 1900 being used where no official information was received for 1901:

THE WORLD'S INDUSTRIAL CONSUMPTION OF GOLD AND SILVER IN 1901.

Country.	Gold.		Silver.		
	Weight.	Value.	Weight.	Coining value.	Commercial value.
	<i>Kilograms.</i>		<i>Kilograms.</i>		
Austria-Hungary	3, 553	\$2, 361, 300	45, 431	\$1, 888, 100	\$876, 200
Belgium	2, 543	1, 690, 100	20, 000	831, 200	385, 700
Brazil	750	498, 400			
Central America	2	1, 200	31	1, 300	600
Egypt	1, 077	715, 800	5, 034	209, 200	97, 100
Finland	195	129, 600	1, 937	80, 500	37, 400
France	21, 600	14, 355, 400	189, 600	7, 879, 800	3, 656, 700
Germany	10, 743	7, 139, 800	150, 000	6, 234, 000	2, 893, 000
Great Britain	28, 810	19, 147, 100	275, 022	11, 429, 900	5, 304, 200
Italy	5, 000	3, 323, 000	21, 000	872, 800	405, 000
Netherlands	656	436, 000	12, 415	516, 000	239, 500
Paraguay	3	2, 000	100	4, 200	1, 900
Portugal	2, 000	1, 329, 200	9, 500	394, 800	183, 200
Russia	4, 259	2, 830, 500	114, 733	4, 768, 300	2, 212, 800
San Salvador	31	20, 700	168	7, 000	3, 300
Sweden	600	398, 800	6, 000	249, 400	115, 700
Switzerland	6, 300	4, 187, 000	70, 000	2, 909, 200	1, 350, 100
United States	26, 149	17, 379, 100	399, 714	16, 612, 100	7, 709, 100
Other countries	5, 000	3, 323, 000	50, 000	2, 078, 000	964, 300
Total	119, 271	79, 268, 000	1, 370, 685	56, 965, 800	26, 435, 800

WORLD'S PRODUCTION OF GOLD AND SILVER IN 1901.

GOLD.

During the calendar year 1901 the world produced 12,740,746 ounces of gold, of the value of \$263,374,700, thus exceeding the output of 1900 by 425,611 ounces, or \$8,798,400—a gain of 3.4 per cent. The total production, however, was almost \$44,000,000 less than it was in 1899, the year of the greatest known yield—a decrease due to the almost total suspension of gold mining in the Transvaal, consequent upon the Boer war—Africa having contributed not less than \$73,000,000 worth of gold to the world's supply in 1899 and only about \$9,000,000 in 1901. The increase throughout the balance of the world, therefore, was, approximately, \$20,000,000.

The United States produced 3,805,500 ounces of gold, valued at \$78,666,700, during the year under examination, thus maintaining its place as the leading gold-producing nation of the world. Australasia was second, her yield amounting to 3,719,080 ounces, of the value of \$76,880,200, while Canada was third, with 1,167,216 ounces, or \$24,128,500 to her credit. Russia followed, with 1,105,412 ounces, or \$22,850,900. The remaining large producers, ranged according to the value of their yields, were: Mexico, \$10,284,800; British India, \$9,395,900; China, \$9,091,500; and Africa, \$9,089,500. Thus, these eight countries jointly produced \$240,388,000, or over 90 per cent of the world's output for 1901.

Separated according to political divisions, the British Empire leads it having produced, approximately, \$120,000,000, while the United States held second place.

The following table shows the amount of gold produced by each of the six continents:

North America.....	\$113,720,300
Australia	76,880,200
Asia.....	25,485,700
Europe.....	25,436,200
South America.....	12,762,800
Africa.....	9,089,500
Total.....	263,374,700

SILVER.

In 1901 the world produced 174,998,573 fine ounces of silver, of the commercial value (at 60 cents per ounce) of \$104,999,100. This was an increase over the product of the preceding year of 1,407,209 ounces, or a loss in commercial value of \$2,627,300, owing to the fall of 2 cents in the average price of silver which ruled in 1901 as compared with that of 1900.

In 1901 Mexico secured the first place among the silver-producing nations, her output amounting to 57,656,549 ounces, of the commercial value of \$34,593,900, while the United States followed with 55,214,000 ounces, of the value of \$33,128,400; Australasia produced 13,049,243 ounces, valued at \$7,829,500; Chile, 9,255,130 ounces, worth \$5,553,100; Bolivia, 10,254,260 ounces, or \$6,152,600, and Peru, 5,600,848 ounces, valued at \$3,360,500. Thus it will be seen that these six countries together produced over 86 per cent of the total yield of the world.

The geographical origin of the product, by continents, was as follows:

North America.....	\$71,395,700
South America.....	16,227,400
Australia.....	7,829,500
Europe.....	8,460,300
Asia.....	1,086,200
Total.....	104,999,100

Africa produced no silver in 1901.

The total production of the precious metals throughout the world in 1901 amounted to \$368,373,800, distributed as follows:

North America.....	\$185,116,000
Australia.....	84,709,700
Europe.....	33,896,500
South America.....	28,990,200
Asia.....	26,571,900
Africa.....	9,089,500
Total.....	368,373,800

The Western Hemisphere, therefore, produced gold and silver to the total value of \$214,106,200, or approximately 58 per cent of the entire yield of the world.

INCREASE AND DECREASE FOR 1901 AS COMPARED WITH 1900.

Country.	Gold.		Silver.	
	Increase in 1901.	Decrease in 1901.	Increase in 1901.	Decrease in 1901.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
United States.....		24,397		2,433,000
Mexico.....	62,152		218,741	
Canada.....		181,504	793,942	
Africa.....	20,201			
Australasia.....	163,574			291,020
Russia.....	130,875		13,694	
Austria-Hungary.....		252	7,932	
Germany.....		299	110,207	
Norway.....				6,937
Sweden.....		828		7,997
Portugal.....		20		
Finland.....		21		
Greece.....			142,390	
Turkey.....	510		287,039	
Argentina.....		661	7,268	
Bolivia.....				716,350
Chile.....		27,109	5,092,412	
Colombia.....	77,709		17,484	
Ecuador.....	113			
Guiana:				
British.....		12,786		
Dutch.....		2,818		
French.....	20,282			
Peru.....	11,802			1,694,977
Uruguay.....	38			
Central America.....	6,786			133,619
China.....	170,139			
British India.....		1,917		
British East Indies.....	14,042			
Total.....	678,223	252,612	6,691,109	5,283,900
Net increase.....	425,611		1,407,209	

The following table shows, by calendar years, the production and value of gold and silver in the world since 1860:

PRODUCT OF GOLD AND SILVER IN THE WORLD SINCE 1860.

[The annual production of 1860 to 1872 is obtained from 5-year period estimates, compiled by Dr. Adolph Soetbeer. Since 1872 the estimates are those of the Bureau of the Mint.]

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1860.....	6,486,262	\$134,083,000	29,095,428	\$39,337,000	\$37,618,000
1861.....	5,949,582	122,989,000	35,401,972	46,191,000	45,772,000
1862.....	5,949,582	122,989,000	35,401,972	47,651,000	45,772,000
1863.....	5,949,582	122,989,000	35,401,972	47,616,000	45,772,000
1864.....	5,949,582	122,989,000	35,401,972	47,616,000	45,772,000
1865.....	5,949,582	122,989,000	35,401,972	47,368,000	45,772,000
1866.....	6,270,086	129,614,000	43,051,583	57,646,000	55,663,000
1867.....	6,270,086	129,614,000	43,051,583	57,173,000	55,663,000
1868.....	6,270,086	129,614,000	43,051,583	57,086,000	55,663,000
1869.....	6,270,086	129,614,000	43,051,583	57,043,000	55,663,000
1870.....	6,270,086	129,614,000	43,051,583	57,173,000	55,663,000
1871.....	5,591,014	115,577,000	63,317,014	83,958,000	81,864,000
1872.....	5,591,014	115,577,000	63,317,014	83,705,000	81,864,000
Total	78,766,630	1,628,252,000	547,997,231	729,563,000	708,521,000
1873.....	4,653,675	96,200,000	63,267,187	82,120,800	81,800,000
1874.....	4,390,031	90,750,000	55,300,781	70,674,400	71,500,000
1875.....	4,716,563	97,500,000	62,261,719	77,578,100	80,500,000
1876.....	5,016,488	103,700,000	67,753,125	78,322,600	87,600,000
1877.....	5,512,196	113,917,200	62,679,916	75,278,600	81,040,700
1878.....	5,761,114	119,092,800	73,385,451	84,540,000	94,882,200
1879.....	5,262,174	108,778,800	74,383,495	83,532,700	96,172,600
1880.....	5,148,880	106,436,800	74,795,273	85,640,600	96,705,000
1881.....	4,983,742	103,023,100	79,020,872	89,925,700	102,168,400
1882.....	4,934,086	101,996,600	86,472,091	98,232,300	111,802,300
1883.....	4,614,588	95,392,000	89,175,023	98,984,300	115,297,000
1884.....	4,921,169	101,729,600	81,567,801	90,785,000	105,461,400
1885.....	5,245,572	108,435,600	91,609,959	97,518,800	118,445,200
1886.....	5,135,679	106,163,900	93,297,290	92,793,500	120,626,800
1887.....	5,116,861	105,774,900	96,123,586	94,031,000	124,281,000
1888.....	5,330,775	110,196,900	108,827,606	102,185,900	140,706,400
1889.....	5,973,790	123,489,200	120,213,611	112,414,100	155,427,700
1890.....	5,749,306	118,848,700	126,095,062	131,937,000	163,032,000
1891.....	6,320,194	130,650,000	137,170,919	135,500,200	177,352,300
1892.....	7,094,266	146,651,500	153,151,762	133,404,400	198,014,400
1893.....	7,618,811	157,494,800	165,472,621	129,119,900	213,944,400
1894.....	8,764,362	181,175,600	164,610,394	104,493,000	212,829,600
1895.....	9,615,190	198,763,600	167,500,960	109,545,600	216,566,900
1896.....	9,783,914	202,251,600	157,061,370	105,859,300	203,069,200
1897.....	11,420,068	236,073,700	160,421,082	96,252,700	207,413,000
1898.....	13,877,806	286,879,700	169,055,253	99,742,600	218,576,800
1899.....	14,837,775	306,724,100	168,337,453	101,002,600	217,648,200
1900.....	12,315,135	254,576,300	173,591,364	107,626,400	224,441,200
1901.....	12,740,746	263,374,700	174,998,573	104,999,100	226,260,700
Total	206,854,956	4,276,071,700	3,297,601,599	2,874,041,200	4,263,565,400
Grand total.....	285,621,586	5,904,323,700	3,845,598,830	3,603,604,200	4,972,086,400

WORLD'S COINAGE, 1899, 1900, AND 1901.

In the Appendix will be found a table, revised from the latest information received, exhibiting the coinages of the various countries of the world during the calendar years 1899, 1900, and 1901.

COINAGE OF NATIONS.

Calendar year.	Gold.	Silver.
1899.....	\$466,110,614	\$166,226,964
1900.....	354,936,497	177,011,902
1901.....	248,093,787	138,911,891

While the above figures represent, as accurately as the Bureau has been able to ascertain, the total value of the gold and silver coinage of the world during the calendar years 1899, 1900, and 1901, they do not accurately represent the value of the coinage from new material alone, but include the value of the recoinage of foreign and domestic coins and that derived from old material, plate, jewelry, etc., melted and used in coinage. Many foreign governments in their reports to the Bureau failed to separate the values of the coinage derived from these various sources.

The following table exhibits, by calendar years, the fine ounces and value of the gold and silver coinage of the world since 1873:

COINAGE OF GOLD AND SILVER BY THE MINTS OF THE WORLD FOR THE CALENDAR YEARS SINCE 1873.

Calendar year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
1873	12,462,890	\$257,630,802	101,741,421	\$131,544,464
1874	6,568,279	135,778,387	79,610,875	102,931,232
1875	9,480,892	195,987,428	92,747,118	119,915,467
1876	10,309,645	213,119,278	97,899,525	126,577,164
1877	9,753,196	201,616,466	88,449,796	114,359,332
1878	9,113,202	188,386,611	124,671,870	161,191,913
1879	4,390,167	90,752,811	81,124,555	104,888,313
1880	7,242,951	149,725,081	65,442,074	84,611,974
1881	7,111,864	147,015,275	83,539,051	108,010,086
1882	4,822,851	99,697,170	85,685,996	110,785,934
1883	5,071,882	104,845,114	84,541,904	109,306,705
1884	4,810,061	99,432,795	74,120,127	95,832,084
1885	4,632,273	95,757,582	98,044,475	126,764,574
1886	4,578,310	94,642,070	96,566,844	124,854,101
1887	6,046,510	124,992,465	126,388,502	163,411,397
1888	6,522,346	134,828,855	104,354,000	134,922,344
1889	8,170,611	168,901,519	107,788,256	139,362,595
1890	7,219,725	149,244,965	117,789,228	152,293,144
1891	5,782,463	119,534,122	106,962,049	138,294,367
1892	8,343,387	172,473,124	120,282,947	155,517,347
1893	11,243,342	232,420,517	106,697,783	137,952,690
1894	11,025,680	227,921,032	87,472,523	113,095,788
1895	11,178,855	231,087,438	98,128,832	126,873,642
1896	9,476,639	195,899,517	123,394,239	159,540,027
1897	21,174,850	437,722,992	129,775,082	167,790,006
1898	19,131,244	395,477,905	115,461,020	149,282,936
1899	22,548,101	466,110,614	128,566,167	166,226,964
1900	17,170,053	354,936,497	136,907,643	177,011,902
1901	12,001,537	248,093,787	107,439,666	138,911,891
Total	277,383,806	5,734,032,219	2,971,593,568	3,842,060,383

THE FUTURE OF THE GOLD SUPPLY.

By N. S. SHALER,
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[From the *International Monthly*, November, 1901.]

* * * * *

It has already been noted that gold is a widely diffused metal. In small quantities it exists in most rocks; and even in sea water, as tricksters have learned, it is found in determinable amounts, probably less than 4 cents to the cubic yard, and in a condition that makes it commercially of no possible account. It has been reckoned that in the deposit of clay on which the city of Philadelphia stands there is enough of the metal to gild the fronts of all the buildings in the place. Here, again, the amount is so small that it has no more prospective value than that contained in the sea water. Thus, while it may be said that wherever a person may be on the surface of the earth or on the ocean there is likely to be enough gold within a mile of his feet to make him a millionaire, the places where gold can conceivably be won at a profit are relatively few. In general, those situations may be classed as follows:

First, in order of history, though not of economic importance, are the lodes or veins in which gold has been deposited, commonly associated with other metals, the work being done by the action of heated waters that bear the material upward from the deep-buried rocks where it was taken into solution by those waters.

Second, and most important for our present inquiry, are the accumulations of detritus arising from the decay of rocks containing gold, in the slow process of wearing down of the lands, a process that lowers their level to an amount, on the average, of 1 foot in something like five thousand years. In the course of this action the gold is left in a more or less concentrated state, for the reason that, being heavy, it is not easily borne away to the sea, and being relatively very insoluble, it is not carried away in solution, as are the constituents of the rock.

Third, are the deposits containing gold, formed as last described, which have by chance been brought beneath the sea, deeply covered by strata, and have thus been subjected to influences that have greatly changed their character, though the concentrated gold has remained in them. In certain cases this deep burial may be effected on the land by volcanic materials. We will now consider the probable future of the supply from these groups of sources.

As to the vein deposits containing gold, analysis shows us that most veins contain the metal in some small proportion, and that in a large number of instances it is held in other ores, like those of copper, lead, silver, etc., in such quantity that while taken alone it could not be profitably mined, it is profitable to separate it in the treatment of the

materials. There is in this way a constant increase in the supply of gold which comes as a by-product in the exploitation of other metals.

The most important increase that is to be looked for in vein mining arises, however, from the rapid improvement in the modes of applying power to such work. The gain in this regard in the last half century through the invention of power drills, more effective explosives, better hoisting systems, and more efficient methods of treating the ores, is such that, on the average, in terms of labor, it probably does not at present cost one-third as much to win and treat a given amount of ore from underground mines as it did in 1850. A still further cheapening is now being brought about by the application of electricity produced by water powers to the work of mining.

The most important result of these improvements in mining is the vastly greater field that can be profitably exploited. For 1 ton of such ore as could be regarded of economic value in the ancient practice, containing, say, \$10 per ton of savable gold, there is probably ten times as much that would now be rated as minable, at a yield of one-fourth that amount. Almost as important as the mechanical improvements are those of a chemical nature, particularly that known as the cyanide process. Of old, the miner had to expect that after he had worked a gold-bearing vein to a certain depth, usually but a few hundred feet below the surface, the gold would cease to be "free," and, because of the lack of those changes due to the penetration of water from the surface, would become "base"—that is, locked up in union with iron pyrite and other materials, so that it would not amalgamate with quicksilver or yield to other methods that could be economically employed.

The modern process applied to many of these refractory ores has made them profitable to work, when under no other conditions could they be exploited. Thus, in the mines of the *Weitwatersrand* of South Africa, commonly known as "The Rand," the deposits could not have had any considerable commercial importance but for this method of winning the gold from its association with pyrite, so that the thousands of millions of dollars that have been or are to be obtained from those deposits are in large measure to be accredited to this invention.

Making no allowance for future improvements in mining, though the progress of the art is one of an exceeding rapidity, we may evidently expect a very great and rapid increase in the annual supply of this precious metal from the betterments already effected. As to the extent of this gain, there is no basis for a trustworthy reckoning; but those who have some idea of the amount of gold-bearing veins which can, with skillful mining, be made to yield a profit at the present rates of interest will probably be disposed to agree with me in the opinion that, at anything like the present prices of labor, the yield from this group of deposits is likely, within twenty years, to exceed \$500,000,000 per annum, and to be maintained at this or an even greater rate for many decades.

It is not, however, from the underground mines that there is the most to fear in the way of an excessive gold supply during the next decades, but rather from the second group of deposits, those of an alluvial character. The nature of this class of mines is eminently peculiar; unlike, indeed, that of any other sources of mineral value.

In the ancient method of seeking gold from detritus, the beds of the lesser streams, those in which there was so little water that it could be

turned aside, were resorted to. The gravel was washed by hand in pans, and the crevices of the bed rock cleared of the metal that had lodged there. This work was necessarily limited to the torrents, which were followed downward until they grew to be rivers so large that the water put a stop to further work, as was necessarily the case when the stream became considerable. Because the total area of accessible stream beds in any gold-bearing fields was limited, and the quantity of gravel rich enough to yield a profitable return to hand labor restricted, this source of supply was soon in large part exhausted, with the result that, at the time of the discovery of America, the area which had hitherto furnished gold to the civilized world had apparently ceased to yield enough to do more than replace the incidental waste of the world's store.

In succession, the Peruvian, the Brazilian, the Californian, and other fields afforded fitful enlargements of the supply; but each, in turn, was quickly exhausted or reduced in production to small amounts. So that, about twenty years ago, a survey of the field indicated that the chance of important discoveries of alluvial gold, as well as a great increase of the amount won from deep mines, was small. This I stated in a Government report on the question of bimetallism. As if to show the danger of all judgments that assume a limit to the resources of this marvelous earth, the situation at once began to change; the nascent inventions that tended to cheapen deep mining, as above noted, became rapidly effective, and a new method of approaching low-grade alluvial gravels was soon afterwards developed.

In working the rich placers of torrent beds, and in the temporary and locally used method of washing down the deposits of gravel lying above those beds by the so-called hydraulic process, miners had learned that, besides the highly profitable but very limited deposits of the small streams, there were very extensive accumulations of a like nature, though far less rich in gold, in the beds of the main rivers and in the alluvial plains on either side of them, especially near the mouths of the tributaries which had afforded rich "washings."

The amount of gold in a cubic yard of these alluviums was too small to repay hand labor, especially as the excavations could not be drained by any method of ditching. Many efforts were made in this country to devise dredges and a method of working them which would obviate the difficulties, but they all proved to be failures. When American invention fails, it is generally safe to assume that the obstacle it attacks can not be overcome. Not so in this case, for in far away New Zealand a dredge for working alluvial gravels has been contrived, and has proved so successful that a great industry has been founded on its use.

These machines differ but little in form or method of working from those long in use in deepening ship channels. Their success is due to a skillful adjustment of details and to the development of the art of operating them. This success is such that with labor at the rate of \$2.50 per diem, and a cost of power measured by good firewood at the same price per cord, it is claimed that a cubic yard of gravel can, under ordinary conditions, be lifted from the bed of the pool in which the dredge floats, washed, and returned to the bottom behind the dredge boat, at an average cost of $2\frac{1}{2}$ cents. This estimate, like most estimates in mining, is excessively low, but there is no reason to doubt that under favorable conditions the work can be done for somewhat less than twice that sum, and that by far the greater amount of such

gravels in the world can be treated at a cost that will not exceed, when the work is done on a large scale, and carefully, an average of 6 cents per cubic yard.

To realize what influences the New Zealand dredge and the variations of the type now coming into use in North America and elsewhere may have on the supply of gold, we must now consider, somewhat in detail, the way in which the deposits of alluvial gold are formed. It has already been noted that gold is never found in massive deposits such as contain other common metals. Because of that same relative insolubility which causes it so to resist decay, the processes that bring it into concentration never import large quantities into one vein; but the conditions which limit the accumulation do not prevent the formation of a very great number of small veinlets, none of workable size. Such veinlets and branches containing gold, often almost microscopic, are characteristic of districts in which gold is found.

As the rocks of such a field fall to pieces in the process of decay, all their common minerals, because they are relatively light, are easily carried away to the sea or, because they are soluble, go even more readily on that journey. The gold being about four times as heavy as the ordinary substances, and remarkably insoluble in waters on the surface of the earth, tends to abide when the materials with which it was associated have disappeared. Yet there is a measure of movement given by the streams to the particles in proportion to their size; the smaller journeying farther in proportion to their smallness, as is the fact with all materials that are moved by water. Moreover, gold, because it is quite soft, is easily rubbed when it is held between large stones, which slip over one another in the torrents, so that it smears, or as the phrase is, streaks on the stones. This smeared gold, which may by close observation be detected in any placer, is removed; in the further wearing of the pebbles it becomes a fine powder, such as the torrent may readily bear down to the main river.

The result of the above-described process is that when the region has worn down to the extent of several thousand feet, as has been the case in the placer districts of the Rocky Mountains, while nearly all the broken-up rock has gone to the ocean, a relatively large part of the gold remains in the débris contained in the valleys of the area.

But little of this concentrated gold stays in the narrow torrent-swept gorges where the first placers were found, though in them the richest deposits occurred; by far the greater part of the precious metal has been urged beyond the torrent channels, and, mingled with gravel and sand, has come to a temporary rest in the beds and in the alluvial plains of the rivers. There is no basis for estimating the quantity of the gold in ordinary placers and that in the river beds and their alluvial plains, but there can be no doubt that it is much more considerable in the latter group of deposits than in the former.

There is, however, this important consideration to be taken into account. Since the débris containing gold passes from the torrents, where it is found in some abundance, to the larger valleys, it is pretty certain to be mixed with that of other streams that have none of the metal, or so little as to be of no importance. In this way, the lower lying deposits of sand and gravel may become so far diluted with unprofitable stuff that they may not be workable. As yet the body of knowledge on this point is too limited to give a basis for any reckoning; still, the results obtained by extensive dredging work in New Zealand,

California, Montana, and elsewhere clearly indicate that the aggregate area in the world where alluvial gravels occur which may be exploited by the dredge is very extensive; it probably amounts to several thousand square miles, even if we reckon only those fields where the amount of the metal exceeds 10 cents to the cubic yard, which, for the present, may be taken as the profitable limit.

There are certain other conditions which serve to restrict the possibilities of winning gold from low-lying placers. Thus the field must be so placed that there is near at hand some cheap source of power, fuel, or electrical energy obtained from streams. The gravel must not contain overlarge boulders, nor be cemented, else it is difficult to excavate it and to wash the gold from it; moreover, the gold must not be too finely divided, or it can not be saved. Yet, when all these limitations are taken into account, it remains tolerably clear that the use of the dredge is likely to bring about a sudden and very great increase in the supply of that substance. This increment is apt to be rapid, for the reason that, while a mine or a vein has to be slowly developed by shafts and drifts, with no certainty as to the richness of the material until it is penetrated, a placer, which may be likened to a vein laid upon its side with one of its walls removed, can be promptly explored by pits or drill holes, and at once attacked at as many points as may seem desirable.

It is this readiness and the relative simplicity of the process of developing the new type of placer mines, which are likely to make their product come suddenly into the market in a manner to disturb values. The work will be done under other conditions than vein mining, in which the unforeseeable always enters into an honest reckoning. It will be done with a degree of certainty not attainable in ordinary mining operations, and will, therefore, not demand the large premium on success which is properly required for capital that is ventured in the old way in searching for the precious metal.

As for the districts in which dredge mining is likely to be extensively developed, it is too soon to form any but a very general opinion. The following statement, however, may indicate certain points of importance. An auriferous region, to afford the required conditions, must have been the seat of a long-continued decay, so that a great thickness of gold-bearing rock has been worn away. In this process there must have been no considerable glacial action, for the ice would have swept away the concentrates, mingling them with the débris of the rock which it broke up. The regions, where these conditions may be fairly assumed to exist, include the greater part of the many detached areas known to contain gold-bearing veins of considerable richness, in the cordilleras of North and South America, from the permanently frozen ground of Alaska to Patagonia. It is not impossible that considerable fields will be found in the northern part of South America, as well as in Guiana and Brazil. In the eastern half of North America there is a chance that dredges may be successful on certain of the rivers and their plains in the Carolinas, Georgia, and Alabama. To the northward, as in the gold-bearing area of Nova Scotia, the glacial sheet appears to have removed almost entirely the anciently formed concentrates. Since then there has been insufficient time for these to be reproduced.

Probably the most extensive deposits of gold-bearing gravels as yet known occur in European and Asiatic-Russia—in the Ural district and

Siberia. In this region there are a number of auriferous areas where the process of rock decay has gone on for geological ages, and where there has been an absence of glacial action. Moreover, the rate of descent of the rivers is prevailingly slight, so that less of the gold has been borne away to the sea than is the case in other lands. The result is that, so far as is known, the extent of alluvial plains containing gold appears to be greater in this part of the Old World than in any other of the continents.

There is reason to believe that the conditions which favor the formation of extensive alluvial placers exist in several parts of Africa, especially on the Guinea coast, and in the gold-bearing districts of the southern part of the continent. It is to be noted, however, that there are no certain reports as yet of such deposits in the Transvaal area, where we should expect to find them. At several points in Australia there is evidently reason to believe that gravels, such as may possibly be dredged, occur. From general considerations it may be expected that like deposits will be found in India and in several districts in China. Limiting ourselves, however, to the fields already known to contain extensive deposits of gold-bearing gravels which can be worked by the method of dredging, and noting that this store can be swiftly won, and with little risk of loss, we have good reason to anticipate a sudden and great, though it may be temporary, increase in the supply from this source. It is, indeed, not improbable that, in twenty years from the present time, the annual production from this source may exceed that which is now contributed from all the existing mines. This, be it said, is but an opinion, and is of no value as an estimate.

A third group of gold deposits includes the alluvial materials containing metal which were found in earlier geological periods and have been subjected to burial beneath later accumulations of débris, and more or less changed in the conditions of the under earth. We have long known of the existence of deposits of this nature in the shape of ancient torrent and river channels, filled with gold-bearing gravels, covered by lava flows, and now left, by the wearing down of the country, often at great heights above the existing stream beds. Some of these in California have been opened by tunnels and have proved eminently profitable. We are now learning that, in some instances, gold-bearing sands may be carried into lakes or the sea and there built into sandstones, which, when deeply buried beneath other strata, are likely to be much altered, the gold being dissolved and redeposited. It is not unlikely that this has been the history of the Rand deposits of South Africa. Owing to the fact that such deposits may have a horizontal extent vastly greater than that of any vein, their possible importance as sources of supply becomes evident.

That of The Rand, if such it be, is fairly reckoned as certain to yield more than \$2,000,000,000. As nature repeats itself, with what seems to be a love of so doing, we may fairly assume that the discovery of other like deposits will reward those keen-eyed, intelligent, and indefatigable searchers for the treasures of the under earth, who are now afoot in all lands.

In reviewing, with some brief additions, the foregoing account of the probable future of the gold supply, we see that we are evidently at the beginning of an increase due to an advance in mechanical and chemical inventions which, in terms of labor, has greatly cheapened the cost of production. These innovations have vastly extended the

areas from which the metal may be profitably won. At the same time, the opening of the world to the enterprise of miners and capitalists has served to bring into the field of production many extensive regions which a generation ago were inaccessible. Moreover, the lowering of the rate of interest on money has had its effect in directing attention to investments of this nature. The result of this combination cannot fail to lead to a very great increase in the supply of this measure of values.

In looking forward to the effect of an augmentation in the production of gold, such as we have seen reason to anticipate, we may safely reckon that the first result would be an increase in the price of anything for which money is paid, including labor. This would at once, by increasing the cost of mining gold, tend to lessen the profits of such operations. Thus, at some point in this movement, a balance would be attained which would check the further increment of the supply. It is clear, however, that much disturbance of values would be brought about before this automatic brake could operate. All debts, though their face value would be unchanged, would be as effectively scaled down as though a despot had for his profit debased the coinage of the civilized world.

The question as to the remedy, if indeed there be such, for this apparent danger can not be considered in this writing. Something, how much it is difficult to judge, might be done by extending the use of gold in countries where it does not now serve as a medium of exchange; something, also, by the complete displacement of silver by the as yet more precious metal; but the movement would probably be so strong that these resources could not be safely trusted to arrest it. It might lead to a very important change in our financial system, one that might be revolutionary in its effects.

REPORTS OF THE SPECIAL AGENTS OF THE BUREAU OF THE MINT
ON THE PRODUCTION OF THE PRECIOUS METALS IN 1901
IN THE SEVERAL STATES AND TERRITORIES.

ALASKA.

By CHARLES G. YALE.

It is exceedingly difficult to obtain, with any degree of accuracy, a proper "distribution" of the gold and silver values from Alaska; that is, to ascertain exactly the output of any particular region of "camp." Some exactness is possible in the case of Nome; but even in that case the figures include the output of creeks some distance from that place, but on the same peninsula and tributary to it. Very few men who work the creeks in the summer remain for the winter, and the ordinary method of addressing inquiries to owners or representatives of the claims as to the amount of output is impracticable. For this reason the returns of the United States mints and assay offices, private refineries and smelters throughout the United States must be depended upon to ascertain the approximate yield of Alaska from year to year.

It is evident that the sum of the deposits made at these institutions during the year shows practically the total output of Alaska, as the companies and men dispose of their gold at these places, in order to obtain the coin as soon as may be.

The following table shows the gold and silver product of Alaska for the calendar year 1901:

STATEMENT OF BULLION OF ALASKAN PRODUCTION RECEIVED AT THE UNITED STATES MINTS AND ASSAY OFFICES AND AT PRIVATE REFINERIES AND SMELTERS DURING CALENDAR YEAR 1901.

Metal.	Standard ounces.	Value.
Gold	372,607.197	\$6,932,226.86
Silver (coining value)	57,149.48	66,499.13
Total.....	.....	6,998,725.99

As the gold product of Alaska in 1900 was \$8,166,187.46 and the silver \$96,734.50, it will be seen that in 1901 a decrease is shown of \$1,264,195.96 in these metals from the previous year. This is doubtless due, largely, to the decrease in output from the Nome field, where unfortunate complications prevented the working of many claims, and also because the ocean beach at that place was practically worked out of its richest deposits the previous year.

According to returns from United States mints and assay offices and from private refineries and smelters on the Pacific coast where a separate record was kept of receipts from Nome and the rest of Alaska, the Nome district in 1901 yielded \$4,110,712.37 in gold and \$20,979.54 in silver, a total of \$4,131,686.91. From this same field in 1900 there came, according to the same sources of information, \$5,100,000, so that the decrease from Nome was apparently \$968,314 as compared with the previous year. All the mints, refineries, etc., did not keep

Nome receipts separate from the rest of Alaska, so these differences in output for the year may not be exact; but sufficient is known to show that the receipts of gold and silver from Nome were at least \$968,314 less than the previous year.

Doubtless the receipts from the Golovin Bay region, near Nome, are included in these figures, as the miners there ship from the same place.

Returns from the quartz mines in southeastern Alaska, Unga Island, etc., were not complete, some failing to answer inquiries as to output, but the larger mines on Douglas Island, the principal quartz producers of Alaska, yielded in the aggregate in 1901 the sum of \$1,981,775.

Therefore, knowing that the total product of gold and silver in Alaska in 1901 was \$6,998,725, and that practically \$4,131,686 of this came from Nome with \$1,981,775 from the Douglas Island quartz mines in southeastern Alaska, there is left but \$885,264 to be distributed as the result of mining in the remainder of Alaska during the year. This would include the yield of the mines at Circle City, Forty Mile, Koyukuk, Manook, and other points on or tributary to the Yukon River, Cooks Inlet, and the quartz mines on Unga Island and on the mainland of southeastern Alaska. Small amounts from creeks on the Seward Peninsula, tributary to Nome, are doubtless included in the Nome total.

The results of the mining season of 1901 at Nome were very unsatisfactory, owing to two principal causes: First, the shortness of the mining season, and second, the apprehensive and uncertain feeling that prevailed on account of the immense amount of litigation that followed the advent of the judiciary in the summer of 1900. On account of the frozen condition of the ground but few claims were opened up before midsummer, and in many cases rich claims were not worked at all during the summer. The uncertainty in regard to titles increased rather than diminished during the season, and there was no change in this condition until the departure of the court officials in August in response to the citation for contempt issued by the United States circuit court of appeals at San Francisco. The rulings of Judge Wickersham, who arrived in September, to the effect that original locators of mining ground would be permitted to work their claims and that jumpers would receive no consideration, restored confidence to the community and gave back to the owners possession of many good properties; but this relief came too late to have any appreciable effect on the output for the season.

Anvil Creek, which, as in former years, was the most productive creek in the district, was worked extensively from No. 2 below to No. 10 above discovery. The claims below No. 2 discovery proved a disappointment and have practically been abandoned. A number of bench claims on the east side of Anvil from No. 5 above discovery to the head of the creek have proved to be rich and were worked successfully during the season. The gulches coming into Anvil from the east continue to be good producers, Nickola Gulch being especially rich. The pumping plant in course of construction by the Wild Goose Mining Company, which will supply water to the benches on Anvil, will probably be completed by the middle of August, 1902, and then large results may be looked for from this vicinity.

Glacier Creek and its principal tributary, Snow Gulch, were worked in a very desultory way during the season. A number of very rich

benches on the west side of Glacier Creek have been thoroughly proved, but on account of litigation and a scarcity of water very little work was done during the season. Late in the season a ditch was completed which supplies water to Snow Gulch and the Glacier benches, and three weeks' sluicing after the completion of the ditch produced about \$200,000. Now that these creeks are supplied with water, the output during the season of 1902 ought to be large. Conservative experts predict that Snow Gulch and the Glacier benches will produce \$3,000,000 at least during the next two years.

Dexter Creek was not worked extensively, owing to the lack of water. There are a number of exceedingly rich benches at the head of Dexter, two or three of which show a bed of gravel 25 or 30 feet in depth carrying good values. With the introduction of water, large returns may be expected from that locality.

Along the southern slope of Anvil Mountain, at a distance of 3 to 4 miles from the beach, there are a number of small creeks which show good pay. Dry Creek, which heads in this vicinity, has three or four claims near its source which have been worked successfully and promise large returns in the future. Newton Gulch and Wonder and Saturday creeks, in the same locality, have a number of good claims.

All of this area will prove productive as soon as water is brought onto the ground, and the Wild Goose Mining Company's pumping plant will no doubt furnish an adequate supply of water before the close of the season of 1902.

Productive mining on the beach at Nome is a thing of the past.

Considerable work was done during the season with sluice boxes and rockers, but the results were unsatisfactory, if the reports of those engaged in this class of mining are to be credited.

On the brow of the hill back of the town of Nome, where the ground slopes down to Dry Creek, a deposit of ruby sand similar to that found on the beach has been discovered in several places. Three or four strings of sluices were operated in this locality during the season.

One of these plants, with 8 or 10 men employed, produced from \$400 to \$600 per day for a short time during the latter part of the season; but the pay streak is narrow and exceedingly thin and will soon be worked out. There are still many practical miners at Nome, however, who have faith in the possibilities of these tundra diggings.

With improved methods and lower wages, considerable gold will no doubt be extracted from this class of mines.

The Bonanza mining district, which adjoins the Cape Nome mining district on the east, was well prospected during the season and two or three creeks were worked systematically, but nothing there has been comparable with the rich creeks in the Nome district. A large dredger was operated on Solomon River, several miles from the beach, during the season, but reports indicate that the results were unsatisfactory and that the enterprise will be abandoned.

A company has been organized to construct a railroad through the Bonanza district. This railroad will begin at Port Safety, about 30 miles east of Nome, traverse the Solomon River Valley, and end at Council City, in the Fish River Valley, and will be about 45 miles in length. The company having the enterprise in hand announce that the work will be completed during the summer of 1902. This railroad will open up the rich creeks in the Golofnin Bay (Fish River) country.

Ophir Creek is the richest and most extensive creek in the Golofnin

Bay district. The Wild Goose Mining Company owns a large number of claims on Ophir and worked its properties there on a large scale during the season of 1901. No. 15 Ophir produced largely, and it will require two or three years to exhaust the claim at the present rate of working. Ophir is undoubtedly the best creek yet discovered in northwestern Alaska and will continue to be a great producer for many years to come. The Wild Goose Mining Company will build a narrow-gauge railroad during the summer of 1902, to connect its mines on Ophir with Council City, a distance of 7 miles.

The Topkuk district, 60 miles east of Nome, showed little activity during the season. Daniels Creek, which, together with the beach claims at its mouth, supposed to have produced about \$800,000 during the season of 1900, reported but small returns for the season of 1901, owing to a scarcity of water and the backwardness of the season. The ground remained frozen all summer, and it was necessary to use thawers. As there is no water in the creek, it has been necessary heretofore to pump water from the beach, and this has been found so expensive that property owners have concluded to wait for the introduction of water by means of a ditch, the construction of which has been provided for. Nos. 1, 2, and 3, Daniels, are exceedingly rich, but no pay has been found above the lower third of No. 4, at which point Black Chief Gulch comes into Daniels from the east. It is reported that good pay has been found on No. 1 Black Chief and that promising prospects have been found on No. 2 Black Chief, indicating that the pay comes from the bluff to the east of Daniels Creek.

Swede Creek, a small gulch emptying into Bering Sea a short distance east of Daniels Creek, contains three or four claims which prospect well. A bed of gravel 15 or 20 feet in depth showing as high as 35 cents to the pan has been found on this creek, and with the introduction of machinery and water it will undoubtedly prove a good producer.

The beach at the mouth of Daniels, from which it was claimed about \$600,000 was rocked during the season of 1900, is practically worked out.

In the winter of 1899-1900 a large number of claims were located on the Bluestone River and its tributaries in the Port Clarence district, about 80 miles west of Nome. During the summer of 1900 two or three claims on Gold Run, a tributary of the Bluestone, yielded large returns, considering the amount of work done. The prospects were so encouraging that a town of considerable size sprung up at Grantley Harbor. This town, which was named Teller City, contained a population of 1,500 by midsummer of 1900, and many predicted that it would soon rival, if not outstrip, Nome in population and commercial importance. As nearly all the claims in the district were tied up by litigation during the season of 1901, it was impossible to determine whether the natural resources of the region justify this prediction.

Two or three claims on Alder Gulch and one or two claims on Gold Run are known to be rich, and it is probable that many others are of like character, but the unsettled condition in regard to titles paralyzed the community and the town was practically deserted at the close of the season.

A great deal of prospecting was done during 1900-1901 on the

streams emptying into Kotzebue Sound, on the northern side of the Nome Peninsula. Many creeks that show good prospects were staked on the Good Hope, Kougarok, and Keewalik rivers. Several tributaries of the Kougarok were worked during the season of 1901 and gave satisfactory results. Late in the season sensational reports were received from Candle Creek, a tributary of the Keewalik River. Many claims are reported to show from \$1 to \$10 to the pan, but these reports lack confirmation. Making all due allowance for exaggerated reports, however, it can confidently be predicted that the streams tributary to Kotzebue Sound will yield millions of the precious metal in the near future.

Within a few hundred miles of the region now under consideration will be found the verification of Humboldt's prediction that the greatest gold deposits of the world will be discovered within the Arctic Circle.

Good reports continue to come from Koyukuk River, a tributary of the Yukon, heading far within the Arctic Circle. About \$150,000 was brought out from the diggings at the close of the season of 1901. More than half of this gold came from Emma Creek. There are a large number of creeks in the district which are undoubtedly rich and which would yield good returns under normal conditions, but as provisions cost \$1 a pound laid down at the mines it is impossible to work any but the richest claims. The commercial companies are making every effort to meet the demand, and good returns may be expected from this district in the near future.

Very little work was done in the Birch Creek district (Circle City) during the season of 1901. Three or four claims on Mastodon Creek were worked, and the production was supposed to be about \$200,000. A number of claim owners on Mastodon, who have been operating in Dawson and Nome for two or three years, have signified their intention of returning to their old field of operations, and it is likely that Mastodon, which is one of the best creeks in the north, will be worked extensively next year.

The Rampart district just about held its own during the season of 1901, the output being reported at \$150,000. Some new discoveries have been made, principally on the benches along old creeks, and an increased output is expected next year.

The claims on the American side in the Fortymile district were worked in a very desultory way during the season of 1901. The output for the district is placed at \$250,000 by the commercial companies.

Sensational reports have been received of a big strike on Chicken Creek, which empties into Fortymile River about 125 miles from its mouth. This strike, which occurred during the past winter, has resulted in a stampede from Dawson.

The most important quartz mines in Alaska are those on Douglas Island. These three mines in 1901 worked 1,267,212 tons of ore, yielding practically \$2,000,000. The largest of the properties, producing and milling 623,068 tons of ore, obtained a gross yield of \$1.88 per ton and paid dividends on that. This is the cheapest mining and milling in the United States. These three mines employ 910 miners.

As a matter of interest connected with this northern region it will be proper to give the returns from mints and assay offices, private

refineries, etc., as to amount of gold and silver received during 1901 from the Northwest Territory (Klondike). The statement is as follows:

STATEMENT OF BULLION OF NORTHWEST TERRITORY PRODUCTION RECEIVED AT UNITED STATES MINTS AND ASSAY OFFICES AND PRIVATE REFINERIES AND SMELTERS DURING CALENDAR YEAR 1901.

Metal.	Standard ounces.	Value.
Gold	954,194.903	\$17,752,463
Silver (commercial value).....	154,225.12	83,282

STATEMENT OF BULLION OF ALASKA PRODUCTION RECEIVED AT UNITED STATES MINTS AND ASSAY OFFICES AND PRIVATE REFINERIES AND SMELTERS DURING CALENDAR YEAR 1901.

Metal.	Standard ounces.	Value.
Gold	372,607.197	\$6,932,227
Silver (commercial value).....	57,149.48	30,861

ARIZONA.

BY CHARLES C. RANDOLPH.

Phoenix, Ariz.

From the reports submitted to me by mine owners and operators, and from estimates made in cases where accurate information was withheld, I am able to supply the following figures covering the gold and silver output of Arizona in the year 1901:

Gold	\$4, 196, 000
Silver (commercial value).....	1, 907, 200

The product of silver, amounting to 3,200,000 ounces, is given in figures of commercial value, the average price of the metal for the same year being 59.6. While the total figures for 1901 are less by \$782,800 than those representing the operations in 1900, it must not be inferred that the mining industry in the Territory is waning. On the contrary it is in the most promising condition.

Two potent agencies—fire and litigation—combined to affect the statistics for the year. For instance, there was a disastrous fire at the Commonwealth gold mine in Cochise County which prevented production for the greater portion of the year. The famous Crowned King mine, in Yavapai County, which has produced millions in gold, was idle in 1901 because of litigation among its owners. The Mammoth mine, in southern Pinal County, one of the most noted producers in former days, was shut down pending the adjustment of its property rights.

At Crown Point mine the energies of the management were devoted to the construction of a road connecting the property with Wickenburg and to the installation of oil-burning apparatus. In my report for 1900 I directed attention to the fact that in Arizona copper ores almost invariably are associated with the precious metals. Gold and silver form a considerable item in the operation of all the big copper plants. One of the best-known copper companies, that reported to me a product of over 159,000 ounces of gold in 1900, was in 1901 obliged to shut down its plant for repairs, and it produced only 278 ounces of gold. On the other hand this company shipped over 24,000 ounces of silver last year, as compared with about 11,000 ounces in 1900.

The United Verde mine, at Jerome, was idle some time as the result of a strike, a cave in, and a fire, and its return of gold was substantially lessened. The Little Jessie, in Yavapai County, once a noted gold producer, was nonproductive last year by reason of court proceedings. The Hillside mines were among the nonproducers for the same reason. It is entirely within the mark to say that but for litigation there would have been at least \$1,000,000 to add to the figures representing Arizona's product of gold and silver in 1901. There are indications that well-known properties that have been thus hampered will soon be set

free. If this hope is realized the Territory is certain to maintain the gratifying rate of increase that was so noticeable in the report of the Director of the Mint for 1900.

There was more activity in the development of mining properties in Arizona last year than in any year since the discovery of gold in the Territory. Hundreds of thousands of dollars' worth of machinery was installed. Stamps are dropping to-day where a year or two ago there were but insignificant prospect holes. The activity is not confined to any particular section. A report of a rich strike in Yavapai County is apt to be followed in a day or two by the announcement of a wonderful find in a district hundreds of miles distant. The marvelous history of the Oro Grande mine, near Wickenburg, has served to fill the adjoining hill with prospectors, and dozens of rich claims have been located. One of the discoverers of the Oro Grande sold his one-sixth interest in February, 1902, for \$100,000. He said, in explanation of his action, that he had promised himself to quit when he had made a clear \$100,000, and did so in spite of his knowledge that his interest was worth several times as much as he asked for it. There is no doubt that the remaining owners will realize a stupendous sum in the near future. Since the discovery of this mine about 2,000 feet of development work has been done, and this has shown up one of the largest and richest bodies of gold ore ever discovered in the world. Crosscuts have been run over 100 feet on the levels without encountering either a hanging or a foot wall. The main shaft, at this time of writing, is down more than 300 feet, and the ore remains as rich as ever, it being a common occurrence for the miners to find specimens assaying well into the thousands. Nuggets have been taken out on the different levels weighing a half ounce or more each. Although several thousand tons of ore have been hoisted, there is no waste dump. The ore body, as far as uncovered, is richer than that of the famous Vulture mine, which produced \$16,000,000. A number of extensions of the Oro Grande and adjoining claims are being developed, showing up the same character of high-grade ore. The Oro Grande is being equipped with first-class machinery. The mine is situated only 3 miles from the old town of Wickenburg, which has already felt the stimulus of its wonderful richness.

In October, 1901, an enormously rich body of silver-copper ore was discovered within a few miles of the Oro Grande. The ore was found on the surface, where it had been walked over for years, and it assayed as high as eight and ten thousand ounces to the ton. The ore body is in a peculiar formation merging into a granite conglomerate. Within a few days after the discovery the claim was bonded for \$60,000, and development work has since been carried on with most satisfactory results. Crosscuts are being run, and conservative mining engineers predict the opening up of one of the largest and richest silver-copper mines in the world.

On the heels of this remarkable discovery came the news of a bonanza find in the Dos Cabezas Mountains, hundreds of miles to the southeast. P. J. Scanlan and two partners had secured a bond on the old Casey ground near Wilcox, and in November started to do the assessment work. They began on an old tunnel, and soon discovered ore stains on the north wall. Thinking they were close to the ore body they began to prospect the surface, and found indications which led them to believe that the ore body was farther to the north. Accordingly

they put in a few shots and soon encountered ore. After stripping the ground for a distance they discovered the foot wall and began sinking a shaft along it. They sunk 50 feet in solid ore in which there was hardly a pound of waste. At a depth of 50 feet, finding no bottom to the ore body, they started to drift to see if they could find the hanging wall. At the time of the preparation of this report they had penetrated 20 feet without finding the hanging wall. Other drifts have been started, but there is no sign of a break in the ore. The size and dimensions of the ore body are at this writing unknown, but the cropping of this enormous deposit can be traced for miles over the surrounding country. The ore is carbonate, strongly impregnated with iron, copper, gold, silver, and also bismuth and cobalt. Throughout the enormous mass appear bunches of ore which assays as high as \$1,200 in gold. Five samples assayed at Lordsburg, N. Mex., produced the following general average: Gold, 15 ounces: silver, 85.2 ounces; copper, 10 per cent.

Much space might be consumed in descriptions of other rich properties that have been discovered since the report for 1900 was written. Enough has been said, I believe, to bear out the assertion I made last year, that in a few years Arizona's statistics of gold and silver production will make a wonderful showing. The Territory is a veritable treasure house.

The factors in the decreased production of gold and silver in 1901 extended to the production of copper as well. In addition, the decrease in the price of copper operated to lessen the output. Returns from the big mines, and conservative estimates covering the smaller and isolated plants, show that about \$28,000,000 worth of copper was mined in the year. Inasmuch as the metal is widely diffused in the Territory, it will figure largely in the following reports of the mining industry in the different counties. The value of the lead product will not exceed \$500,000.

COCHISE COUNTY.

Twenty years ago the Tombstone mines, in this county, spread the fame of Arizona throughout the world. Now that a monster corporation, the Tombstone Consolidated Mines Company, Limited, has assumed control of the old workings, and proposes to make Tombstone again one of the greatest producers of the precious metals in the United States, the history of this wonderful camp, with a description of the work necessary to be done to reclaim it, will be interesting.

The mines of Tombstone were discovered in 1877 by Edward L. Schiefflin, but the first discoveries were in a remote part of the district, and it was not until the spring of 1878 that the mines, which afterward became so widely celebrated as producers of the precious metals, were located. The first claim was called the Tombstone, and, recognizing the great promise of the region, Mr. Schiefflin induced his brother, Albert E. Schiefflin, and Richard Gird to join him, and together they located in rapid succession claims covering the principal outcrops of the district. It was an undertaking full of peril at the time, as the region was infested with Apache Indians, but the success of the discoveries soon brought others, and the town of Tombstone, already a thriving place of several thousand inhabitants, was incorporated in the latter part of 1879. The readjustment of ownership, following the discoveries and early work, resulted in a division of the more valuable

claims into three groups, known as Grand Central, Contention, and Toughnut, each taking the name of its most important claim, and the reorganized companies which followed still retain these names, with the exception that the company organized to work Toughnut group took the name of the Tombstone Mill and Mining Company. Many other companies were organized, among which were the Head Center, Tranquillity, Empire, Vizina, and Sulphuret, each controlling valuable claims, and, in addition, many productive claims were held by individuals; but all of these, although adding much to the gross production of the district, were overshadowed by the three great groups named above. Phenomenally rich ore in great abundance led to the speedy construction of mills, and by June, 1879, the Grid 10-stamp mill, the first in the district, and the machinery for which was hauled over 300 miles in wagons from Fort Yuma, on the Colorado River, then the terminus of the Southern Pacific Railway, was started. The ore averaged over \$100 per ton in value, and the tailings about \$25. Other mills followed quickly, and there were soon 150 stamps dropping on Tombstone ore. It was a dry camp. There was no water available for milling near the mines, and the mills were all located on the San Pedro River, at distances ranging from 8 to 10 miles away and involving an expenditure of \$3.50 per ton for hauling the ore. Wages and supplies were very high. Railroads were hundreds of miles away, and the new camp was beset with difficulties of all kinds, but such was the richness of the ores and their abundance that, notwithstanding the difficulties and the fact that treatment of the ores was not at first understood, and that a large part of the values passed into the tailings, dividends were soon pouring out at an astonishing rate.

The camp being at first a dry one the mills were located on the river, thus involving the necessity of an expensive wagon haul. There was little in the appearance or surroundings of the camp to suggest the existence of water, and when it was struck in the Sulphuret shaft, at the comparatively shallow depth of 500 feet, it was a surprise to all. Other shafts, including the Contention, Grand Central, West Side, Head Center, and Empire, reached water soon after, and demonstrated that it was to be found at practically the same level throughout the district. The mines at this time were still working in high-grade ore bodies far above the water, and no doubt was felt as to easily pumping it out and continuing down when it should become necessary. The Grand Central Company installed a line of direct-acting steam pumps capable of raising 500,000 gallons in twenty-four hours; but, to the surprise of all, the withdrawal of this amount of water produced no appreciable effect. The Contention Company then put in a Cornish plant of 12-inch pumps at an expense of about \$150,000, and capable of raising 1,000,000 gallons in twenty-four hours, and again the attempt to sink was made, but it soon became evident that the combined capacity of the pumps was inadequate. The Grand Central then put in a line of 14-inch Cornish pumps of 1,500,000 gallons capacity, and at a cost of in the neighborhood of \$200,000, and together the two Cornish plants gained steadily on the water and sinking below began. But much valuable time had been lost, and from lack of appreciation of the seriousness of the problem the rate of dividends had gone on undiminished without retaining an adequate reserve for contingences. Furthermore, there was a lack of harmony among those concerned, which prevented the attainment of the best results. A depth of 100

feet below the water level was reached, and it was demonstrated that the water could be controlled; that it was, in fact, a basin which, once exhausted, could be held in check with a moderate expenditure for pumping.

Other mines than the Grand Central and Contention took advantage of the recession of water and began pushing down, proving the continuance of the ore below the water and its excellent grade. Both the Grand Central and the Contention shafts were vertical, and it was necessary to crosscut for the ore bodies. This was going on and very rich ore found, that in the Contention assaying about \$100 per ton in gold. Up to this point (May, 1886) the situation was good. The mines were still working in ore above the water, and it had been conclusively shown that the water could be controlled and mining go on indefinitely when a disastrous fire utterly destroyed the fine Grand Central hoisting works and pumping machinery. There is no doubt that the Contention pumps could have held the water in check alone, after this disaster, until other machinery could have been put in the Grand Central, but the pumps were stopped and the workings allowed to fill. Finally, through the carelessness of a watchman, the Contention plant took fire, and its complete destruction postponed indefinitely the workings of the mines below the water.

The history of the mines, as shown by the records, was short and brilliant. During the few years of really active work—about six in all—they produced in round numbers \$16,000,000 and made net earnings about \$6,000,000. Mining went on afterward to a limited extent above the water in mines not affected by the fires, and, indeed, is still going on, and while it is impossible to obtain the exact figures, the gross output of the camp has probably been in the neighborhood of \$25,000,000; but the fires ruined the deep shafts and were followed by extensive caving, due to the burning of the timbers, so that much of the ground known to still contain ore bodies above the water has been inaccessible.

No one familiar with the geological condition at Tombstone and the nature and trend of the veins, which bear every evidence of deep-seated origin, has doubted that at some time the water would be pumped out and the mines resume their former activity and productiveness, but those who have followed the situation closely have long been convinced that it would not be done until either by purchase or consolidation the ownership of the principal mines was practically merged, for it is doubtful if there exists a more fruitful field for litigation as to the extralateral right than this would become with active work and diverse ownership. In the early days litigation, costing hundreds of thousands of dollars, took place. The conditions are very similar in many ways (but complicated further by the existence of true fissure veins) to those obtaining at Leadville, where the attempt to apply the extralateral right resulted in such inextricable confusion that it was finally abandoned altogether. The consolidation of all the principal mines of Tombstone under one control has removed the chief obstacle to the resumption of active work.

The ore deposits of the Tombstone district are of two types—those occupying nearly vertical parallel fissure veins and having a general northeasterly and southwesterly strike, and those occupying the crests of the anticlinal folds, crossing the first described at nearly right angles and dipping to the southeast. The Grand Central and Con-

tention groups of mines were in the sandstones and shale, and the Toughnut group of mines in the underlying shales, limestone, and quartzites. The more friable rocks of the Grand Central and Contention were shattered and distorted by folding and faulting, and by the injection of a huge porphyry dike, so that the geological structure was more obscure than in the Toughnut group, where firmer rocks made the situation plain where explored by underground workings. The dip of the limestones and quartzites carries them, with their ore bodies, below the water level before reaching the line of the Grand Central and Contention fissure veins, but ultimately, and within easy reach of mining works, the two systems will intersect, bringing about a situation which all precedent has shown to accompany the great bonanzas of the district. In many mining districts the valuable ore deposits are confined to one particular strata of rock. In Tombstone varying strata, to an aggregate of 3,000 feet, have carried very productive mines, but owing to the dip of the rock and the enforced cessation of work at the water level only the outcropping edges of the strata have been explored. The extent of the underground workings, large though it is, running up to probably 25 to 30 miles, is still but a scratch compared with what will be possible when the ground is freed from water.

Tombstone is known as a silver camp, and the market price of silver being much lower than when the mines were first opened, the question is frequently asked, Would the mines be profitable now? A candid consideration of the fact shows that the answer to this must be an emphatic yes, and for several reasons. The Tombstone ores are almost unique in their high grade, so that even at the present discount on silver their market value would be high as compared with ores of other districts. But the ores carry both gold and lead in addition to silver, and both of these constituents showed a steady increase with depth, so that in the case of the one mine, which carried no gold at the surface, ore was shipped from the lower workings which carried more gold than silver, and at the water level the average value in gold was \$35 per ton, which would be considered high-grade ore by almost any exclusive gold mine. A similar increase of gold was noted in other mines, particularly in the Contention, where the ore below the water level carried about \$100 in gold per ton. Furthermore, the early work was done under all sorts of expensive disadvantages. The railroad was at first 300 miles away and the machinery and supplies were brought in by mule teams. Even when the railroad was brought to the nearest point it ever reached, freights were still high, and there remained the 10-mile wagon haul on both ore and supplies. From the tonnage produced and the average charge for hauling it is estimated that fully \$1,800,000 was paid out in wagon freight for ore alone. In the early working of the mines expensive mistakes were made from the impossibility of knowing beforehand how to place the shaft and workings so as to best reach the ore. Wages were very high. Powder was \$1 per pound, and now it is 15 cents, and other supplies have declined proportionately. Mining machinery and mining methods have both improved wonderfully during the last twenty years, so that what was impossible then is an everyday matter now. Improvements in both the methods and cost of reducing ores have gone hand in hand with improvements in mining, and mines are paying handsomely to-day that were worthless a few years ago. The experience of working

hundreds of thousands of tons of Tombstone ores shows that they may be relied on to average at least \$40 per ton at the present prices. The location of the new mills at the mines will save the 10-mile wagon haul, and a railroad built into the camp will permit of economical delivery of fuel, timber, and other supplies directly to the points where they are to be used. Taking everything into consideration, it is extremely likely that, under the conditions now prevailing and with the advantage of a clear understanding of the situation, the same ores would prove more profitable than they did at the higher prices of silver twenty years ago.

The new company has sunk an entirely new vertical shaft for draining and hoisting, reaching the water level at 569 feet on November 16 last. The shaft has four compartments, two for rock and two for pumps, and measures 7 by 22 feet inside the timbers, which are of the best quality of 10 by 10 inch Oregon pine. Two hoisting engines are to be installed, having cylinders 16 by 24 and 16 by 60 inches, the latter a first-motion rock hoist and the former to handle the pumps. These hoists will be capable of going to a depth of 2,500 feet. Steel buildings and a steel gallows frame are being erected to guard against fires, which have been so disastrous in the past.

The boiler plant will consist of four 200-horsepower internal furnace boilers made for 125 pounds working pressure. The station pumps are of the duplex triple-expansion condensing type, two with cylinders 15 and 23 inches, and 39 and 13 inch plungers with 24-inch stroke and two with the same sizes of steam cylinders and stroke but 9¼-inch plunger. Two of the above pumps go at the 600-foot level and two at the 1,000-foot level. The sinking pumps are simple, direct-acting duplex pumps, with steam cylinders 14 by 12 inches and 8-inch plungers. There are five of these, three to be in continuous use while the fourth is lowering and the fifth held in reserve for contingencies.

The work in hand will take several months and it is not likely that a start will be made below water level before July 1, 1902, after which time the work of sinking will go on rapidly. Arrangements are being made to build a railroad to the camp from Fairbank. The company has had the mines examined and reported on by some of the best-known mining engineers of the country, who are unanimous in their opinions of their great value.

THE COUNTY IN GENERAL.

During the year mining operations throughout Cochise County were very extensive. The Empire Smelting Company is erecting a smelter at Benson, which will be in operation soon. It will have a capacity at first of 100 tons, but before the end of the year this will be increased to 500 tons. This marks the beginning of custom smelting in Cochise County, and will mean the development of hundreds of gold, copper, silver, and lead mines in that county.

At Gleeson an 80-ton furnace has been installed within the past year, and the new camp is so rapidly coming to the front in developing ore bodies that additional smelting facilities will be needed this year. The mines at Gleeson are known as the Copper Belle, and the owners have been engaged the past year in opening up ore bodies, in which they have been very successful.

Several large hoists have been placed upon the Copper Belle claims and other surface improvements have been made during the year. At

the Turquoise camp, near Gleeson, extensive development work has been carried on and a number of hoists have been put up for deep working.

The Black Diamond mines have been extensively developed in the past year and large bodies of ore opened up, the work in fact seems to justify a 250-ton smelter which is now being built, and is almost ready to be blown in. The camp is becoming an important one.

At Dos Cabezas the Casey mines are the richest gold properties in that portion of Cochise County and will, no doubt, soon become large producers of bullion. Large shipments of ore are now being made from these mines.

Large pumps are being put in the Commonwealth mines at Pearce and, during the past year, the property has been equipped with an accommodation 80-stamp mill which replaces the 40-stamp mill burned early in the last year. The mines are being worked constantly and the output runs as high as \$200,000 a month. It is a gold-silver property, and one of the most substantial ones in the Southwest. Several hundred men are employed in the mines and about the camp. Bullion shipments are made from Cochise on the Southern Pacific Railroad.

The big 1,000-ton smelter at Bisbee of the Copper Queen Company will be torn down and taken to Douglas where the smelting operations of the company will be carried on in the future. At Douglas the water is more plentiful and the new town, being on the border, is close to the great Nacosari copper properties of the Copper Queen Company. The new smelter at Douglas will be much larger and have a greater capacity than the present one. There are 1,500 men employed at the Copper Queen mine and works and the new location of the smelter will take a large number of men from Bisbee, although the greater number will remain to work in the mines. The Calumet and Arizona Company will also locate its smelter at Douglas. It will be a 350-ton smelter, and at Douglas will be in close proximity to the mines of the company. The Calumet and Hecla mines were purchased and developed last year. They were formerly owned by Martin Costello, who received \$500,000 for them. The workings at present are down 1,200 feet. A 350-horsepower hoist has been placed upon this property during the year which is capable of hoisting from a depth of 2,000 feet. This is the largest hoist at present in use in Arizona.

The production of copper at Bisbee is 35 tons a day, but this will be increased when the new smelter is built at Douglas.

About Bisbee are a number of promising mines which have been developed during the year, and throughout Cochise County a large amount of equipment of mines is going on in the shape of hoists and small mills.

COCONINO COUNTY.

The operations of this county were confined to the Grand Canyon district, which unquestionably contains many rich properties. The Coconino Copper Company some time ago acquired the Red Cloud and Bishop mines, lying north of the Colorado River in the Buckskin Mountains. These mines are reported as very promising, but as yet there have been no shipments of ore worth mentioning. The extension of the railway from Williams to the rim of the Grand Canyon undoubtedly will have a very stimulating effect upon mining operations in this district. The Cameron mine, in the Grand Canyon, north of Flagstaff, was quite extensively developed during 1901. It is considered to be very valuable.

GILA COUNTY.

Mining in this county is confined chiefly to copper, although considerable gold and silver is found in connection with that metal. The United Globe Company and the Old Dominion Company operated their properties most of the year, but the output was somewhat smaller than that of 1900. The Globe district is situated on the northwestern slope of the Pinal Mountains. Between 1876 and 1883 this district attracted much attention by reason of the many discoveries of rich silver veins. The low price of silver has served to lessen activity in the development of silver mines. The building of the Gila Valley, Globe and Northern Railway a few years ago, connecting the district with the Southern Pacific Railway, has stimulated development work in all parts of the district. The Black Warrior copper mines at Globe produced but little during the year, for the reason that the company was developing sulphide ores from which to make sulphuric acid for leaching purposes. Additions to the machinery also were made. It is expected that the company's operations in 1902 will result in a large product of copper. Throughout Gila County there was considerable development work done during the year, many good gold and silver properties being discovered. Much Eastern capital has been invested, and it is entirely within the mark to say that in a year or two the county will come to the front as one of the big producers of the Territory.

GRAHAM COUNTY.

The largest mine in Graham County is the property of the Arizona Copper Company, at Clifton. The daily output of copper is very large. There is a 2,000-ton smelting plant and two 500-ton concentrators, one at Clifton and the other at the Longfellow claims, near by. It is claimed that the Arizona Copper Company makes a profit of \$3,000,000 a year, yet some of the ores worked run less than 3 per cent copper. Great gas works are used to furnish power. Great economy is shown in the operation of these works and mines. The Clifton mines, as they are commonly called, are the most substantial ones in Arizona, running without the loss of an hour's time throughout the past year.

At Morenci there is a 1,000-ton smelter and a 500-ton concentrating plant, the latter an acquisition of the past year. It is claimed that 40 tons of copper are produced every day at this camp, and during the year 1901 it made wonderful strides, coming into the front rank of copper producers of the Southwest. The camp is now a very important one, and the mines are found to be very rich.

Not far distant from Clifton are the Shannon copper mines, which have been equipped with a 300-ton smelter. A concentrating plant will be put up this year. These mines have been developed during the past year, and the large bodies of copper ore mark them as constant producers for many years to come.

In the Clifton-Morenci district there are a great many copper mines which have been developed during the past year. The American Electric Company has secured some claims, which have received their attention during the year. All about that district there was great activity during 1901, and the future of the district was never brighter.

In the western portion of Graham County there are some mining districts, but the development has been slow and mostly profitless. The big mines are in the eastern part of the district.

The advancement in mining in Graham County has been most noticeable during the year in the camps of Clifton and Morenci and the surrounding districts. These districts have evidently just begun to reveal their wealth.

MARICOPA COUNTY.

Surrounding the great central valley of Maricopa County, in which Phoenix is situated, are ranges of mountains of moderate height, and in almost every hill valuable minerals are to be found in greater or less degree. In this section of the Territory alluvial deposits have been greater than elsewhere, and without doubt bonanzas have been covered that farming land might be made.

And yet the greatest gold mine that the Southwest has ever known is in Maricopa County, though at present quiescent and for years practically untouched. It is the Vulture, located about 65 miles northwest of Phoenix. It was discovered in 1863 by Henry Wickenburg, and the time of its production was about ten years. It is told that the mine made hundreds of men rich, and that the miners stole more gold in the shape of nuggets than was ever turned into the coffers of the company. About \$3,000,000 was produced within three years from what would now be considered mere surface scratchings. In later years an 80-stamp mill was installed by a Boston company and water was brought from the Hassayampa by pipe line. This pipe line was destroyed by flood in 1889, and since that time little has been done with the mine. It was bonded lately by a new corporation, which promises to develop the mine far deeper than its present lowest level—500 feet—and to restore the Camp Vulture to its old-time activity.

Not a stone's throw from the line of the county, 40 miles east of Phoenix, lie the mines and works of the Mammoth Company, mainly owned by Sullivan & Hall, of Denver. This property undoubtedly yielded several millions of dollars in gold from a vein formation that is strangely like that of Cripple Creek, Colo. Though the mill was shut down last year, the mine is still being quietly explored, with strong probabilities that another bonanza will eventually be uncovered.

In the Cave Creek district the principal property is that of the Phoenix Mining Company, a New York corporation, that has a 70-stamp mill and a 140-ton cyanide plant. The company is now developing its water supply with the expectation of resuming milling soon. It has a tremendous ledge of low-grade gold ore, which will probably be concentrated eventually.

Adjoining the Phoenix is the Maricopa mine, which has been sunk 200 feet down to water. It has a Huntington mill for the working of its gold ores. West of this is the Ben Hur group. Adjoining are the Mexican and old Rackensack mines. The former has a 10-stamp mill, and both have good, strong leads of medium-grade ore. In the same group are mines owned by Marcel Dugas and by Lieutenant-Colonel Dravo, of the Regular Army. In the latter's mine a fine streak of rich gold ore was lately struck.

Only 14 miles north of Phoenix lies the Winfred district, wherein years ago several strikes of rich free-milling surface ores were made. The most important property is the Union mine, which has been developed to the depth of 450 feet. It has a 10-stamp mill and a cyanide plant. Two miles east of the Union is the Winifred mine, a patented claim, developed 160 feet deep, and a mine of considerable promise.

Ten miles west of the Union mine, in the foothills of the Bradshaw Mountains, is the Relief mine, lately sold to a company represented by George Hamlin, that has a 30-foot vein of copper-stained quartz with much free gold, values being found to the extreme depth of the shaft, 217 feet. The property is remarkable from the fact that not another mine or mineral property can be found within 10 miles of it.

At Winters Well, in the desert beyond the Hassayampa, is rich gold ore, much of which has been shipped with profit. In the White Tanks Mountains, in the western part of the county, are a score of excellent gold properties, in one of which there is a $3\frac{1}{2}$ -foot vein of 10 per cent copper ore that runs \$20 to the ton in gold.

In the extreme southwestern part of the county a large number of claims have been located in the Eagle Trail Mountains. One group of claims has been bonded by a northwestern company for \$50,000. The corporation for the purchase of the mines will place its smelter on the Gila River, about 15 miles distant. The ores run 20 per cent in copper and about \$8 in gold.

South of Phoenix, in the western Estrella range, is a group of 13 claims, upon an immense ledge that bears gold, silver, and copper.

In the Maricopa Hills, within a few miles of Phoenix, to the south, gold croppings are abundant, and at one time a small mill was worked on ores brought down from Telegraph Gap. On the southeastern slope a number of men are hopefully sinking on a filled-in shaft that apparently had been worked by the Spaniards hundreds of years ago. Near Tempe are still to be found the ruins of a number of old Spanish smelters, around them being slag that carries a considerable portion of copper, but which must have been worked for gold or silver at the time of the expulsion of the Spaniards by the Indians. The shafts the Spaniards dug were filled up by the Indians, and, to as great an extent as possible, all signs of their presence were obliterated.

While the output of the precious metals in Maricopa County was not heavy in 1901, there was a good deal of prospecting and development work done, and the outlook for increased activity is extremely bright.

MOHAVE COUNTY.

While there was no increase to speak of in the output of gold and silver in Mohave County during the year, there was decided activity in the way of prospecting and the development of mining claims. For years this section of the Territory has been noted for its silver product. The White Hills camp, ordinarily a heavy producer of the white metal, was closed down a portion of the year through a shortage of water. The plant at Chloride was greatly restricted in its operations because of an inadequate water supply for the concentrators. The shipments of ore from Kingman and Chloride, the two railroad points, were about equal to those of the previous year. Several old mines that had long been neglected were reopened and successfully operated. In the early part of the year the Minnesota mine shipped about ten carloads of concentrates a month. The main shaft had reached a depth of 500 feet.

The new 100-ton concentrating plant of the Tennessee mine began operations in April, and has been turning out three carloads of high-grade concentrates weekly. There have also been shipments of hand-sorted lump ores from this property.

The Elkhart company has started a new 1,500-foot shaft on the Argyle location. Water in the lower levels of the old shaft caused considera-

ble delay, and a new pumping plant was installed. A new chute of silver and lead ore was found on the 500-foot level. The mill has been working on the new ore.

The Pinkham mine produced gold, silver, and copper from the 17-foot ore body.

At the Lucky Dog there was great satisfaction because of the success of the new ore chute. The ore is of the same character as that found in other parts of the mine, except that the gold and copper is present in greater quantity.

The Schuylkill company has two steam hoists in operation, the latest one being employed on the new 1,500-foot shaft.

The turquoise mines of Mohave County attracted considerable attention during the year, several being sold to Eastern capitalists. The Turquoise Queen mine shows every evidence of having been worked by prehistoric people. It is situated on the top of a sharp ridge. The ancient working consists of a hole about 30 feet deep and of the same diameter. This opening was pounded out of the rock with stone hammers. Dozens of hammers, some of them weighing 30 pounds or more, are scattered about the vicinity. The turquoise found in this mine is of superior quality. It occurs in seams in the rock, which is of granite, the seams being of gypsum. It is the purpose of the owners to develop the mine in the coming year.

The Katherine gold mine has at this time of writing all the characteristics of a bonanza; some of the samples secured have run as high as \$300 to the ton. Practical miners who have examined it say it is similar in many respects to the Comstock lode. The company owning it is arranging to operate it by water power, to be developed on the Colorado River, and this in turn to generate electricity sufficient to meet the power requirements of the mine. To secure this power Walker's endless cable current water wheel is to be employed. This invention, which has been successfully tested in the Missouri River, consists of two flexible steel cables, with rubber cores, two steel shafts hung in iron slides, with oscillating journals and roller bearings. Four steel wheels 8 feet in diameter, with grooved rim, carry the endless cable, to which at intervals of 2 feet are gripped blades 12 feet long and 30 inches wide. Twenty of these blades are constantly in the current, and there is a straight central pull. It is said that the power is only limited by the number of blades and the force of the water. The current of the Colorado River is very swift at this point. For this size wheel a boat is built 22 feet wide and 60 feet long, to be securely moored to the shore, and to rise and fall with the current. There is a sluiceway in the center of the craft, in which the cable wheel is rigidly fastened. The electric machinery is on the boat, directly connected with the wheel, and the power from the dynamos will be transmitted by wire. The installation of this plant is being watched with great interest. If it proves to be successful many mines, situated some distance inland on both sides of the Colorado may be benefited, as it has been demonstrated practically in Montana that electric power may be transmitted many miles for the operation of mining machinery with a loss of not to exceed 7 per cent.

PIMA COUNTY.

In Pima the advancement in 1901 was chiefly in the pushing of work upon old properties, equipping them for rapid and deeper work, and

in a number of instances in placing smelters upon them for producing copper matte. There was one serious shut down, that of Helvetia camp, which appeared to be caused mainly by the absence of water and the ability to develop it. This camp during the year produced a great deal of copper, and rich bodies of ore were opened up. The camp at one time contained upward of 800 people. But at this writing, it is "busted," as the cowboys say, and there is scarcely anything left to mark the activity of a few months ago. The mines are reputed to contain good ore bodies, and it is possible that within the present year operations will be renewed, providing water can be secured.

In the Old Baldy district, 7 miles from Helvetia, W. B. McCleary has opened up some excellent copper mines. His Jackson, Star Pointer, and Bluedird mines show excellent results, and the camp will soon be ready for reduction works. The Old Baldy district is to-day one of the most promising in this part of Arizona.

The Old Liberty mine southwest of Tucson has produced 125 tons of rich ore during the brief time it has entered the class of shippers. This mine was recently acquired by the present company. The ore runs about 300 ounces in silver and some shipments running as high as 1,028 ounces have been made. There are four shafts on the property, one 160 feet, and the other over 100 feet, together with several drifts and short cuts. At the present time a drift is being run to connect two shafts which are 200 feet apart. The drift has been driven 160 feet. These mines are located in the Silver Hill district near Arivaca.

The Oceanic mine is owned by Charles Worres, who conducts sampling works in Tucson. This mine has been a constant shipper of rich gold ore for the past year and is regarded by mining men one of the most promising mines of the future in Arizona. Ore has been blocked out for shipment and miners are constantly employed in getting it out.

The Banner mine in the Sierrita Mountains has come into prominence within the past year. It was formerly owned by Judge Satterwhite, of Tucson, who sold it to an Eastern company recently. Frequent shipments have been made from the mine since it came into the possession of the new company. It is equipped with a hoist, but the company proposes to place reduction works upon the property as soon as the development of ore bodies warrants it.

Over the range are the copper and lead mines of Sylvester W. Purcell, of Tucson. Only development work is going on there, but the lead claims are reputed to be the most promising in this portion of the Territory. Several hundred feet of work has been done and the ore is opened up extensively.

Wheeler and Perry's mine in the Sierritas has produced considerable ore in 1901. A steam hoist and other surface equipment has been added, and the owners are pushing development work with the hope of putting their mines in the list of producers of bullion in 1902.

The Joe Goldtree mine in the Guifes is now down 240 feet, and high grade silver-lead values have been encountered and developed. This mine is located close to the Old Liberty and is upon the same rich mineral belt.

Stead & Fryer have an excellent mine 1 mile from the Sierra Colorado, in the Guifes, which is equipped with a 24-ton steam stamp mill. At the present time a shaft is being sunk 200 feet to cut the main ledge. The claims will no doubt become steady producers when they are developed.

The American Wolfram Company has hundreds of tons of ore on

its dumps awaiting the erection of reduction works, which are promised this year. Since the company acquired these rich Wolfram claims they have expended large sums of money in opening up their mines, and still have a force of men at work. Sampson and Bent own adjoining claims, where a great deal of work has been done during the year and some shipments of ore made.

The Silver Bell has a 60-ton smelter, and during the year the camp has produced considerable bullion, but operations have been suspended, although the shut down is regarded as only temporary. Upward of 40 men have been employed during the year.

In the Santa Rita Mountains the New York Mining Company, of which H. Buchman, of Tucson, is president, has opened up considerable ore, and the company is developing its mines with the intention of placing a smelter upon the properties within the present year. The Cuprite, which is in the same vicinity, was worked extensively during the year, but owing to litigation was closed down a few months ago.

About 9 miles from Tucson are located some rich nickel producing claims which are owned by H. Melliush. The ore has been developed to a considerable extent and there is a large quantity upon the dumps.

There are hundreds of prospecting camps in Pima County, and many mines which are awaiting capital to develop them and make them producers. The older districts, like the Canyada del Oro, receive considerable attention every year. During the past year Dr. N. H. Matas did a great deal of development work upon his claims. C. F. Schumacher spent considerable money developing his gold mines there, and other parties have rich claims which have received their generous attention. Pima County is in the prospecting stage, and the development of big producing mines is made slowly, but surely.

PINAL COUNTY.

The Catalina Copper Company, in the Catalina Mountains, has completed about 2,000 feet of development work, showing up a remarkable mine. The values are in copper, gold, silver, and lead. The ore is blocked out ready to be mined when the smelter problem is solved. The Condon camp is located close at hand, and a large number of miners are constantly employed there developing the property. The Apache Chief is in the same vicinity and years ago was equipped with a smelter, but the property is at present idle. The work in this district in the past year was directed toward developing the mines for production. Arrangements were begun for a smelter, but the project to build a road through the San Pedro is holding these as well as many other mines tributary to the proposed line in waiting, that the greatest possible advantage may be gained in case the road is completed.

Soto & Hooker are shipping rich copper ore from a mine in the foothills of the Catalinas, and they propose to thoroughly develop their claims and continue shipping. They ship from Wilcox, and the ore is packed on burros about 60 miles to that place.

The recent discovery of the Gold Mountain in the Galiuro Mountains assures Pinal County of another rich producer this year. The strike is one of the most remarkable in the history of Arizona, the ore being formed in an immense quartz-porphyry dike, which rises over 200 feet high and has a width of 200 feet, all thoroughly impregnated with gold values. This mine is bound to become one of the great low-grade

gold producers of the Territory as soon as arrangements are made for milling the ore. The Galiuro Mountains have scarcely been prospected in the past years, but the discovery of Gold Mountain has turned prospectors that way, and a number of important strikes have been made. On the east slope of the Rincons there are a great many rich copper and gold claims, which were developed last year, and some have provided shipping ore.

The Mammoth and Mohawk gold mines were producers throughout the year until a few months ago, when both were closed down. The Mammoth is involved in litigation, but it is generally conceded that the mines will reopen within a few months. Nearly 1,000 men were thrown out of employment when these mines ceased operations.

The Saddle Mountain Company has placed a 10-ton concentrating mill upon its property, and other surface improvements are about to be made. The ores carry both gold and silver. Shipments of concentrates are made frequently. The Deer Creek and Stanley Butte mines, farther on, are rich in gold, copper, and silver. The Dan Carr group of twenty claims has produced a great deal of shipping ore.

A 60-ton smelter is being placed upon the Troy mines, and will be in operation before this report is printed. The Troy and Manhattan mines are now controlled by one company, and during the past year have been developed wonderfully, particularly the Troy claims, where extensive ore bodies have been opened up. In the Alice mine a 12-foot body of ore has been found which will average 14 per cent, and other like developments have occurred to attract attention to this mining camp. During the past year several hundred thousand dollars have been expended in opening up these mines, which were found in the prospect stage by Manager Charles Cutting when he bought them for his company. To-day they are regarded as mines which will become very profitable producers when the smelter is erected. The mines are well opened, the ore is held in stopes ready for systematic mining, and the camp is substantially built, showing that the company is there to build up a great mining camp.

There are a number of copper claims in the vicinity of the Troy which have produced shipping ore during the past year. At the head of Pinto Creek some rich copper and gold mines have been developed, but no surface works have been erected.

In the Mineral Creek district the Bobtail Mining Company has recently found some bodies of gold ore, and a 5-stamp mill was placed on the property a few months ago. The same company has acquired the Miller group of mines, located near by, and these mines will also provide ore for the stamp mill. The Bobtail mines are high-grade gold properties, and mining men predict a great future for them. The Ray mines and the large concentrating mill are closed down and have been for the past six months, owing to litigation. The Ray was formerly the greatest mining property in the Mineral Creek district, and it is to-day as far as the merit of the mine goes, but the camp is without the slightest activity. It is impossible to say how long it will remain idle.

The Bryan group of copper mines, near Riverside, contain shipping ore, and considerable work was done in developing the ore during the past year.

Dudleyville is the center of mining activity which is carried on in a small way in the mountains about. During the year only develop-

ment work has been done and no attempt has been made to ship ore, owing to the distance to the railroad. The report that a railroad is to be built through the San Pedro Valley has awakened a new interest in mining in that portion of Arizona.

Florence is becoming a mining center of considerable importance. The development of gold, copper, silver, and lead claims tributary to Florence during the year has been very great and the mines opened up are in the hands of substantial investors, mainly from the Eastern States, who will develop them thoroughly before placing works upon them. The Minneapolis Mining Company is sinking a shaft 500 feet and encountering good ore values as work progresses. This company proposes to place a small smelter upon its mines this year if the development of the ore bodies warrants it. Only the richest mines tributary to Florence have produced shipping ore, owing to the adverse conditions which exist in the frontier country of Arizona. Mining is carried on at the greatest expense and everything needful is packed over dry deserts from the railroads. In spite of such conditions the mining districts have been remarkably developed, and a large number of mines there have been worked at a profit. The Silver King was a producer for years when the country was only partially settled, and there was scarcely any attention paid to agriculture. Provisions were shipped hundreds of miles to feed the miners. To-day the rich lands along the Gila basin provide all manner of vegetables, hay, and grains, and the mines in the mountains are well provided.

A Boston company has recently acquired the Noland group of claims, and the operations so far have been very successful in opening up the ore. This company has spent considerable time and money in finding a copper property in Southern Arizona which suits them, and they feel that they have found one now which is worth developing. When the claims are developed a smelter will be erected.

The mining districts about Florence have shown a great deal of growth during the past year in development work—more so than any previous year, and the mining men of that section of Arizona feel that the true worth of their mining country is just beginning to attract attention.

In the counties of Pima, Santa Cruz, and Pinal during the past year the work on the whole has been chiefly in developing ore bodies, and the work has been carried on so successfully that mining men look for the erection of a great many small smelters throughout these counties. Already plans are being made for the erection of a custom smelter at Benson, which will be supplied with ore by the mines of the east slope of the Rincons, the Catalinas, and Galiuros.

At Patagonia custom sampling works have been erected, and ores are shipped there from the surrounding districts. A great many small mines have contributed toward encouraging development work throughout that portion of Arizona.

It is generally conceded among mining men that the past year has been one of the greatest in the history of mining in Southern Arizona, and the year 1902 promises to become even more productive of good results.

SANTA CRUZ COUNTY.

In the Santa Rita Mountains the Calabasas Copper Company has built a 60-ton smelter and opened up some copper claims. The smelter was blown in in February last and the production of copper begun.

Washington camp is the most productive and the district of greatest importance in Santa Cruz County. The ore bodies are found in a great lime belt approximately 3,000 feet wide and 7,000 feet in length, and within this belt are a great many rich mineral-bearing ledges. The ores of the belt comprise copper, iron, lead, and silver. In this belt are located well-known mines such as the Pride of the West, the Copper Century, the Poole group, and the Duquesne mines. The Duquesne has a steam hoist and a shaft which is down 640 feet. Several hundred feet of workings connect this shaft. The mines are at present shut down.

The Pride of the West mines adjoin the Duquesne, and this camp is now in full operation. The mines are opened by shafts and tunnels, disclosing a vein from 8 to 30 feet in width, carrying rich copper sulphides. There is a concentrating mill and smelter, both of which are being remodeled and enlarged to about their double capacity. The mill when newly equipped will contain 2 crushers, 5 sets of rolls, 4 magnetic separators, 9 Wilfley tables, and a roasting furnace. This mine has been a constant and reliable producer, but the mines have been able to furnish more ore than the old mill could take care of, hence the additional facilities.

The Copper Century is close to both the Duquesne and Pride of the West mines. It embraces the old Belmont property, in the old workings of which are exposed great bodies of copper ore. Two gasoline hoisting plants are being put up. All the work that has been done upon this property is in ore.

The World's Fair Mine is one of the great silver mines of Santa Cruz County. The mine produces very rich ore, and the owner has refused \$500,000 for his property. He works it spasmodically, taking out money as he needs it. When he accumulates \$10,000 or \$20,000 he takes his family and travels until it is gone. It is a shipping mine.

The Grand Reef mine, in the Huachuca Mountains, has seen its greatest development during the past year. This camp has produced a great deal of ore and the mines have been equipped with machinery for extensive work.

R. R. Richardson is preparing to start up the Hardshell mine again in a short time. This mine was a producer during the most of last year, but was shut down on account of a cave-in, which made a great deal of expense and delay. This mine will become a producer again very shortly.

A discovery was recently made in the Huebabi Mountains, near the Jesse Grant mining camp, which is attracting mining men. The ore runs 3 and 4 ounces in gold to the ton, and the new mine promises to become one of the important producers this year.

YAVAPAI COUNTY.

The actual increase in the production of gold, silver, and copper in Yavapai County during 1901 over the previous year was comparatively small, but the development work accomplished on Yavapai County mines exceeded that of any similar period in its history. A great deal of mining machinery was installed and the statistics for 1902 will show a remarkable increase over the production of 1901.

The output of gold in Yavapai County in 1901 amounted to \$1,800,000. The production of silver exceeded 500,000 ounces. The amount of copper produced exceeded in value \$11,000,000, the greater part of

which was produced by the United Verde mine, at Jerome. The older plants that contributed in the past to the output of gold and silver were nearly all shut down during 1901, most of them being in the Bradshaw country, the section that first attracted the attention of the world to Yavapai County as an important producer of mineral. Existing conditions, such as a lack of transportation facilities, the low price of silver, the distance from the base of supplies, and, in one or two instances, litigation have been the cause of the inactivity in the great Bradshaw region for the past few years. However, the railroad is now being extended from the present terminus at Mayer into the heart of the Bradshaw Mountains, and the Development Company of America, a strong syndicate organized for the purpose, has bonded about 50 of the more important properties in that district. The outlook for the renewal of active operations upon the completion of the extension of the railroad is exceedingly bright. Such well-known mines as the Tiger, Ora Bell, California, Gray Eagle, Crowned King, Gladiator, Mohawk, Boze, Wild Flower, Lincoln, Peck, War Eagle, and Silver Prince will probably be in operation again with new and improved machinery, and will add very materially to the output of Yavapai County in 1902-3.

The marked activity in the county during the year was in the development and exploration of new properties which were taken hold of as mere prospects and developed into important producing mines.

The principal mines which furnished the output of gold in 1901 were the Congress, in Martinez district; Octave, in Weaver district; United Verd, at Jerome; Penn Gold Company's properties, on Lynx Creek; the McCabe and Dividend, in Big Bug district; the Gold and Copper Consolidated Company's properties, in the Hassayampa district and on Slate Creek, and the Empire mine, on Groom Creek.

The silver produced in the county in 1901 was a by-product in every instance, none of what are known as strictly silver mines having been in operation.

The Poland-Hamilton mines, in Big Bug district, have been extensively developed and a 20-stamp mill and 8 concentrators were installed, together with a hoist capable of sinking to a depth of 1,000 feet, the plant being operated by a large compressor. On both the Big Bug and Lynx Creek sides of the mountain the Poland tunnel is being driven as rapidly as men and machinery can do the work. On the Big Bug side this tunnel is now in about 1,150 feet, two large Ingersoll-Sargent drills being used in this work. Three Leyner drills are being used in opening up ore bodies that have been cross-cut by means of the Poland tunnel. About 125 men have been steadily employed in the development of the Poland-Hamilton mines and the work of driving the tunnel through the mountain.

The Cash mine, in Hassayampa district, has been sunk to a depth of 400 feet, with nearly 2,000 feet of drifting and upraises, and enough ore has been blocked out to keep the new plant erected last year in steady operation. A 10-stamp mill, 5 concentrators, and 2 large steam hoists have been installed.

The same management has developed the Monte Cristo mine, on Groom Creek, and erected a 5-stamp mill, concentrators, and a steam hoist capable of working at a depth of 500 feet.

A steam hoist was erected on the President group, Hassayampa district, last spring, and thousands of tons of high-grade milling ore

have been opened up on this property since by the Gold and Copper Consolidated Company, composed of Illinois capitalists.

The Yager Canyon Copper Company commenced the sinking of the main shaft on its property, which is located on the west slope of the Black Hills, last spring, equipping the mines with a large steam hoisting plant. They are now down 500 feet and have a body of bornite and gray copper ore 5 feet in width, which has been exposed from the 300-foot level down to the present depth of the shaft.

The Standard Smelting and Refining Company have completed a 50-ton mill and put in 5 concentrators on the Agua Fria River for the purpose of working custom ores.

The Val Verde smelter, consisting of one stack, with a capacity of 250 tons daily, and a pyrite smelter of 60 tons capacity, was completed in 1901 and is in steady operation on custom ores and concentrates.

The operations of Gouglas, Lacy & Co., of New York, have been very extensive during the past year. Their Pride of Arizona Copper Company developed the Rebel mine by continuing the main shaft 400 feet, which gives it a total depth of 750 feet. They also did 450 feet of drifting. Machinery installed consisted of a compressor and hoist sufficient for a depth of 2,000 feet.

Their Amalgamated Gold and Copper Company sunk 200 feet, giving the shaft a total depth of 300 feet, and accomplished 200 feet of drifting. The machinery installed consists of a 22-horsepower gasoline hoist and air appliances sufficient for 1,000 to 1,500 feet in depth.

Their Mammoth Gold Company sunk 130 feet, drifting 20 feet, and equipped their mine with a steam hoist sufficient to attain a depth of 2,000 feet.

Their Consolidation Gold and Copper Company cleaned out the old shaft on the Silver Belt mine, which was at a depth of 290 feet, retimbered and sunk 100 feet deeper, ran 400 feet of levels and winzes, and did some stoping. They equipped the property with a steam hoist capable of sinking to a depth of 1,500 feet.

Their El Capitan Copper Company accomplished 100 feet of sinking on their main shaft.

All of the above-named properties are in the Big Bug district.

On their New York group they sunk 60 feet on one claim and accomplished considerable work on ten or twelve other claims of the group. Their equipment is ordered and will be installed this year.

Their Prosperity Mining Company, in Copper Basin, sunk the main shaft to a depth of 200 feet by the use of a whim, but are now putting in a gasoline hoisting plant. Besides this, considerable development work has been done on 15 other claims in the Copper Basin, and sufficient water has been developed for mining purposes.

Their Myrtle Mining Company, on Ash Creek, sunk to a depth of 220 feet on one claim and started development on 16 others of the group.

The Blue Dick mine, on Slate Creek, has been in course of steady development during the past year. A 40-ton smelter was completed the latter part of 1901 and is now in steady operation on the product of this mine.

The properties of the Arizona Blue Bell Copper Company, 6 miles south of Mayer, have been extensively developed and a hoisting plant of large capacity installed. This company purchased two ranches and water rights at Del Rio, 20 miles north of Prescott, for the purpose of erecting a large smelter for the reduction of the Blue Bell ores.

On the property of the Penn Gold Company, on Lynx Creek, a 40-ton Harrington mill was added to the reduction plant, giving it a capacity at present of 120 tons per day. A steam hoist was also erected and a new working shaft started, to be continued to a depth of at least 1,000 feet, one-third of which was accomplished last year.

On the Annie group, Lynx Creek, being operated by M. S. Taft & Co., was installed a steam hoist, and the main shaft was sunk to a depth of nearly 300 feet, which is entirely in high-grade concentrating ore.

The Congress Gold Company added 40 stamps and 10 concentrators to their mill and increased the cyanide plant from 125 to 300 tons daily capacity. A sale of this property to its present owners was made in 1901, the purchase price being reported to have been \$5,000,000.

The most important discovery in Yavapai County during 1901 was that of the Oro Grande mine, near Wickenburg. This property, equipped with a 22-horsepower gasoline hoist, has reached a depth of 300 feet, with nearly 3,000 feet of sinking, drifting, and crosscutting.

The result of the operations at the old McCabe mine, purchased in 1901 by the Model Gold Mining Company for \$300,000, was in the neighborhood of \$100,000 in milling and shipping ores.

Less than \$2,000 was produced by the famous Hillside mines, in Eureka district, on account of pending litigation; but it is said that there is over \$2,500,000 in sight in this mine, the values being principally in gold.

The Summit mine, on the divide between Lynx and Groom creeks, was bonded last year, equipped with a steam hoist, and sunk to a depth of 300 feet. Drifts were run at the different 100-foot levels and fine bodies of gold-bearing ores exposed.

On the Lottie mine and extension, in Big Bug district, a tunnel which is being run through the mountain a distance of 6,000 feet was driven in nearly 2,000 feet during 1901. This property is equipped with a large hoist and 10-stamp mill.

An important feature in the development of Yavapai County properties was the incorporation by local people of at least 20 companies during the year, which have offered treasury stock at from 10 to 50 per cent of its par value and used the proceeds of the sale of these stocks for development purposes, having accomplished more than \$100,000 worth of work on their respective mines. At least 40 steam hoists of small capacity were placed on properties in course of development during 1901.

On Groom Creek steam hoists of large capacity have been installed on the Midnight Test, Victor, and Home Run properties. An average of 400 feet has been reached and thousands of tons of ore exposed in sinking and drifting on these mines.

At Jerome the capacity of the smelter was increased 200 tons daily capacity.

The Dividend Mining Company, on Big Bug, added one 25-horsepower hoist and boiler with capacity of 600 feet to their plant. The mill on this property has been in steady operation and produced nearly \$20,000 in gold.

A novelty in the history of mining occurred through the construction of a branch railroad from Huron to the Poland mines, the graders at work having cut a ledge, heretofore undeveloped, for a distance of 350 feet in length, exposing an ore body carrying an average value of \$10 to the ton in gold. The depth of the cut was 35 feet along the hillside. This is the first known instance where, in the construction of a

railroad, mineralized ledges carrying values of any consequence have been exposed. This was on the Wizard mine, in Big Bug district.

On the Hammer claim of the White Horse group development work consisted of two tunnels, one 200 feet long and the other 150 feet. A shaft was sunk to a depth of 125 feet, and a body of high-grade milling ore 40 feet in width was crosscut.

A great deal of activity was prevalent the latter part of the year in the southern end of the county adjacent to the town of Wickenburg, many properties in that section being now in the course of development, with brilliant prospects for the future of that district.

Placer mining in Yavapai County is no longer an important feature in her gold production, probably not more than 1,000 fine ounces having been yielded in 1901.

The Gladstone mine, adjoining the McCabe, in Big Bug district, was sold last year for \$150,000, the main shaft at the time being down only 200 feet. This property has yielded pay ore almost from the grass roots. The purchasers installed a hoisting plant of large capacity and have been steadily developing the mine and blocking out the ore bodies, which carry high-grade gold values.

The Howell Mining Company, operated in Big Bug district, installed a 50-horsepower boiler, hoist, and a pump on the Iron King mine, the plant being of sufficient capacity to sink a depth of 600 feet. The pump has a capacity of 1,600 gallons per hour. More than 1,000 feet of development work has been accomplished on the property.

The Green Mountain group, consisting of 18 claims on Big Copper Creek, in the Hassayampa district, was purchased by Pittsburg (Pa.) oil magnates, machinery installed, and steady development pursued since August last.

The Hoyt Mining Company, composed of prominent Detroit business and professional men, purchased last year a group of five valuable claims on Lynx Creek, and are opening up mines that from present indications are destined to be big dividend-paying propositions.

G. W. Middleton, as manager of the Copper Cobre Mining Company, organized under the laws of New Jersey with a capitalization of \$1,000,000, has purchased and is developing on a large scale an important group of copper and gold mines on the east slope of the Bradshaws. Several thousand feet of work were accomplished during 1901.

The Copper Prince Mining and Smelting Company, composed of Los Angeles (Cal.) capitalists, has placed machinery on a group of copper mines in Eureka district, and developed a body of ore 20 feet in thickness, carrying values of 10 per cent in copper. This property is looked upon as one of the coming important copper-producing mines of the country.

The McCabe Extension Gold Mining Company placed a hoisting plant, compressor, Gardner drills, and other mining machinery on its mines in Big Bug district, and reached a depth of 300 feet, with levels and crosscuts, during the year.

The King Solomon's Mining Company, of Lima, Ohio, operating large properties in the Kootenay district of British Columbia, acquired the Revenue group of mines in Weaver district, about 5 miles north of the Congress mine. The property consists of 12 full claims, and sufficient development has been accomplished to warrant the erection of a stamp mill and cyanide plant.

The George A. Treadwell Mining Company's properties in the Verde district have been in constant course of development during the past

year. The Brookshire group, comprising mine claims—the Cliff with 7, the Badger with 14, and the Pastime made up of 4, with 9 additional locations, comprise this company's holdings, including an area of 628.51 acres in a solid block of ground, and 753.5 acres altogether. Upward of \$200,000 has been expended, including the purchase price, cost of patenting, and developing these mines up to the close of 1901. The improvements and equipment include a 34-horsepower gasoline air compressor, a 35-horsepower boiler, a 6 by 8 double-cylinder steam hoist, with 1 Leyner and 2 Sargent-Ingersoll drills, installed on the Grand Bounce mine. A tunnel to be driven 1,500 feet is now in 750 feet, and the shaft down to the 300-foot level.

On the Cliff Mine, which has thus far been developed by over 1,000 feet of tunneling and several hundred feet of crosscuts, upraises, etc., a Buffalo blower, driven by a gasoline engine through several hundred feet of air pipe, furnishing the workings with air, and a full equipment of mining and blacksmith tools are all that has been put in as equipment.

On the Iron Queen a 40-horsepower boiler and 40-horsepower single-gear 8 by 12 double-cylinder steam hoist is in steady operation.

Had it not been for the recent slump in copper, a large smelting plant would have been built for the reduction of the ores of Senator Clark's Iron King mines, situated in the same district as the famous United Verde. Arrangements had been completed to erect this smelter, but the work was suspended when the price of copper dropped to its present figure.

The construction of the Prescott and Eastern Railroad, between Prescott and Mayer, a distance of about 30 miles, which provides transportation facilities for the rich mining section to the southeast of the city of Prescott, has caused marked activity in the development of mining properties throughout the Big Bug, Agua Fria, Black Hills, and smaller contiguous districts, and the number of prospects that are being opened up, bonded and sold, are constantly increasing. A branch of the Prescott and Eastern Railroad was constructed from Huron station to the Poland-Hamilton mines near the summit of the Sierra Prieta range in 1901, and the result has been renewed activity in that rich section, dozens of properties having been taken hold of which are now in various stages of development.

Prescott, the natural distributing point for the mines of Yavapai County, has made rapid strides in its growth and improvements during the past year, and the addition to its permanent population was between 1,000 and 1,500, making of it at the beginning of 1902 a city of over 5,000 inhabitants. A great deal of Eastern capital has been attracted to Yavapai County within the past two years, and the development of the mines and production of mineral wealth is constant and rapidly increasing.

YUMA COUNTY.

In my report for 1900 I gave the interesting history of the King of Arizona mine. This magnificent property has been operated continuously during the year. The vein has been proved to a depth of over 600 feet and shows perfect continuity and maintenance of its high average assay and working value. The production in 1901 was remarkably uniform and satisfactory. One shipment, representing

less than one month's work, was valued at \$45,000. The King is regarded as one of the coming big gold mines of the Southwest. The very latest methods are employed and the owners are getting rich.

The other big mine in Yuma is the Fortuna, which has maintained its high record as a producer. At a depth of 900 feet the ledge was lost for a time, but it soon reappeared and with its usual value. Millions in gold have been taken out of the Fortuna.

There was much prospecting in Yuma County during the year, and a number of desirable properties were located.

SOURCE OF PRODUCT.

Gold:	Fine ounces.
From quartz	197,900
From placer	5,100
Total	<u>203,000</u>
Silver:	
From quartz	1,795,000
From lead ores	205,000
From copper ores	<u>1,200,000</u>
Total	<u>3,200,000</u>

CALIFORNIA.

By CHARLES G. YALE.

Returns by producers to the United States mint at San Francisco in answer to requests for information as to output of respective mining properties for the year show the following yield of precious metals in the State of California for the calendar year 1901:

Gold	\$16, 989, 044
Silver (coining value)	1, 229, 356
Total	18, 218, 400

Comparing these figures with those obtained from similar sources the previous year, it is seen that the gold output has increased \$1,125,689 in 1901 over 1900 and that the silver output has decreased \$280,988. The total increase for the year is therefore \$844,701.

Throughout this chapter the figures are given for coining value of silver.

It is probable that these totals show results somewhat in excess of the actual yield, rather than the contrary. The increase in smelting and other reduction works purchasing or treating ores from mines having no reduction works of their own is apt to lead to a duplication of returns in some instances. The copper-smelting companies, for example, purchase large quantities of gold and silver bearing quartz for flux from individual miners or companies and return to the mint lump sums of so much gold and silver resulting from their operations. The miners or companies send their returns also of so much yield from their ores. In this manner there is apt to be some duplication in districts or counties where smelters are operated, as these works give no account of from what mines they obtained their fluxing ores, nor do the miners state whether they worked their own ores or shipped them.

Of the total gold and silver in 1901 the sum of \$14,264,369 was derived from quartz-mining operations; \$1,191,800 from surface placers; \$1,062,450 from drift mining, and \$1,699,781 from hydraulic mining.

In some small amounts the source was undetermined. In the quartz are included the amounts of gold and silver obtained in working copper and lead ores, as well as ordinary gold quartz. The placers include results from claims worked by sluices, rockers and tons, ground sluicing, wing damming in river beds and bars, and also the dredging-machine operations.

The drift mines are those where the deep-lying auriferous gravels are worked by the "drifting" process, which consists in running long tunnels under the lava-capped divides and tapping the ancient river channels, removing only the lower and richer stratum of gravel and then washing it; or, if cemented, crushing it under light stamps. In

some places, as at near Folsom, shafts 70 or 80 feet deep are sunk, and the lower gravel near bed-rock is breasted out, hoisted, and washed.

The larger drift mines, however, are usually opened by tunnels. It may be noted, incidentally, that the more extensive drift mines, especially those on the Forest and Iowa Hill divides, in Placer County, have continued to extend their tunnels in following the gravel channel until they are miles in length. One tunnel in that region is now 18,000 feet in length and another one over 10,000 feet. The gravel is removed by trains of cars operated by compressed air or electricity, the power being generated by the water flowing from the tunnels. The tunnels and drifts are lighted by electricity. A material saving in cost is made by the use of these compressed-air or electric power plants. The loaded cars run out on the grade, and the power is used for hauling them back to the breasts at or near the face of the tunnel.

The natural drainage of the mines furnishes the power for haulage, lighting, and ventilating.

The hydraulic mines are those where the auriferous gravels are so exposed that the whole bank may be washed away by means of streams of water under great pressure being thrown from a pipe line and nozzle or "giant" against the bank. In the drift mines only the lower stratum, which is the richest, is removed. In hydraulic mining the whole mass, top earth and all, is washed away through sluices, where the gold is caught. The hydraulic mining industry is not now as extensive in California as formerly, as all mines of this character operating in the drainage basins of the Sacramento and San Joaquin rivers must now impound behind dams or other restraining works the débris or tailings resulting from these operations. This restricts the output, as not nearly as much gravel may be washed in a given time with a given quantity of water as when the débris passed away and took care of itself without having to be impounded. In Trinity, Siskiyou, and other northern countries, where the streams do not flow into the Sacramento or San Joaquin rivers, there are no such restrictions, and, for this reason, the hydraulic mining industry flourishes most in these regions and is increasing in importance, as new ditches are built and the water supply brought onto new ground.

In the returns from placer mines is included the gross sum of \$471,762 obtained by means of dredging machines in the counties of Butte, Sacramento, Siskiyou, and Trinity. This shows an increase of \$271,000 over the results of 1900 from the same source. The center of activity in dredge mining is in the vicinity of Oroville, Butte County. At that place there are a dozen dredges at work and as many more being built or contracted for. These dredges are not necessarily put at work in the river. In fact, most of them are working ground some distance from the streams. A pit is made in which the dredge is started, and as work progresses the machine cuts its own way and forms a basin, into which surface water flows and floats the boat. The tailings pass behind the machine into the cut, or pit, partly filling it. Large tracts of orchard land are being thus mined, the orchards, of course, being then destroyed.

This system of mining for gold is being rapidly extended in several counties of the State. Tracts of auriferous ground heretofore lying idle are being brought up for this purpose. In this style of mining no ditches or reservoirs are necessary, nor must there be grade or "fall" for dump. Ground which has lacked suitable fall or water

supply may now be mined by dredgers. Quite a number of new machines are being built for men who have bought up such ground. The dredges are, many of them, now operated by electric power obtained from the lines of the power companies. Others are operated by steam power.

From copper mining and smelting operations in Alpine, Calaveras, San Bernardino, and Shasta counties there resulted \$421,385 in gold and \$915,833 in silver for the year, this being included in the total from quartz. Most of this was from the smelters in Shasta County.

While the gold and silver thus obtained was not actually all from the copper ores, it was recovered in smelting them, mainly from the quartz used as flux. The smelters purchase on the basis of assay value the siliceous ores of the quartz miners and mix it with the copper ores in the furnaces. As a result, large numbers of quartz mines are now being worked to furnish this ore, which could not be operated at any profit otherwise. Much of the ore is of very low grade and would not pay to work in a mill. Moreover, most of these mines have no reduction works of their own, nor have the owners money to install them.

The copper-mining operations have heretofore largely stimulated the quartz-mining industry in certain portions of the State.

The returns from producers show that \$116,867 in gold and \$60,925 in silver came from smelting ores carrying lead. This was from mines in Inyo and San Bernardino counties. There was probably a larger amount from this source from ores shipped to the smelting companies, and of which the producers failed to note classes of ore in their reply to the mint inquiries.

There are no special changes to note in the conditions of gold and silver mining in California. The increase of dredging operations has already been referred to. There is an increase in copper mining, which affects the gold-mining industry, as the quartz is required for flux in smelting. New copper smelters have been erected in Shasta County, the older ones have increased their capacity, and new plants are being erected or planned. A new smelter has also been built on the shore of San Francisco Bay to treat copper ores derived mainly in Fresno County. This is also treating ores from Mariposa, Merced, and the other counties south of San Francisco.

In the older mining counties some quite extensive new milling plants have been completed within the past year, and others have been enlarged. A number of new cyanide plants have also been installed. Some few properties of extensive character have been brought to a productive stage.

There is continued evidence of old mines being reopened and equipped properly, and also of more capital being brought into the business generally.

This latter feature is of moment in connection with the future of the mining industry of the State. Quartz mines which have been worked for years in a small way have been purchased by men of means, who have equipped them with suitable machinery so as to make them more productive. There is an active demand for "going" gold mines, though no strong tendency is shown to open and develop prospects. These the miners have to look after themselves, and there are some thousands of them being worked on a small scale, but not yet productive. Since the increase in the output of the petroleum fields of the State and the resultant decrease in the cost of oil to the con-

sumer, large quantities are being used as fuel in place of wood or coal. In certain portions of the mining regions of the State this liquid fuel is being used more extensively, at a decided saving in cost.

In 1901 there were in California 35 counties producing gold and 26 producing silver. Those which produced gold in 1901, which made no such product the previous year, were Alpine, Colusa, Monterey, and San Luis Obispo.

The counties yielding over \$1,000,000 each in gold and silver in 1901 are as follows:

Nevada.....	\$2, 139, 176
Calaveras.....	2, 069, 372
Amador.....	1, 831, 271
Shasta.....	1, 819, 969
Tuolumne.....	1, 710, 155
Kern.....	1, 047, 556

The order in rank of those counties producing over half a million dollars in gold and silver is as follows: Nevada, Calaveras, Amador, Shasta, Tuolumne, Kern, Placer, Siskiyou, Butte, Trinity, Sierra, Mono, and Mariposa.

The order in rank for silver alone, of counties yielding over \$50,000, is as follows:

Shasta.....	\$891, 994
San Bernardino.....	57, 164
Inyo.....	56, 573

The order in rank of counties yielding over half a million dollars in gold alone is: Nevada, Calaveras, Amador, Tuolumne, Kern, Shasta, Placer, Siskiyou, Butte, Trinity, Sierra, and Mariposa.

Alpine has not been among the bullion-producing counties of California for some years until 1901, when a production of \$23,568 gold and \$2,860 silver is shown. A quartz mill has been built at Loope and is to be increased in capacity as the mines are developed. A copper property carrying some gold and silver is also being worked in the county.

Amador County shows, for 1901, the material increase of \$442,568, mainly derived from a greater yield of the deeper and older quartz mines. This is a "Mother Lode" county where very deep mining is being done and where extensive machinery is in use capable of handling ore from great depths. The principal producing mines of the county are as follows: Kennedy, Oneida, Keystone Consolidated, Argonaut, Zeila, Central Eureka, South Eureka, and Wildman Mahoney. The mines of the county give employment to 1,351 men.

Butte County shows an increased yield over last year of \$370,941, which is mainly due to the operations of a large number of dredging machines near Oroville. This is principally a gravel-mining county.

Of late years the gold-dredging industry has increased greatly in importance and a number of large and costly machines are in operation, while still more are being built. The principal producing dredging companies, some of which own several machines, are the Feather River Exploration Company, the Boston and Oroville, Continental, Indiana, Kia Ora, Lava Bed, Marigold, and Oroville Gold Dredging Company. The only large producing quartz mine in the county is the Gold Bank, at Forbestown.

Calaveras is second in rank among the gold-producing counties, and for 1901 shows a product of over \$2,000,000, an advance over the pre-

vious year of \$339,484. This is mainly due to the increased output of the larger mines. The most productive gold mine in the State is in this county, the Utica. The product of the mines is mainly from quartz, although some gravel properties are largely worked.

The principal producing quartz mines in the county are the Utica, Gwin, Lightner, Royal Consolidated, Angels, and Sheep Ranch. The Melones mine, with a new 100-stamp mill will be added to the producing mines of the county for 1902, the mill having been completed this year. There are 1,884 miners employed in this county, which is a larger number than in any other county of the State.

Colusa County, which has made no gold product in some years, shows a return of \$1,800 for a quartz mine at Sulphur Creek.

Del Norte, a placer-mining county exclusively, shows an increased output of \$7,129 from the mines around Crescent City and Gasquet. Some ocean beach black sand mining is carried on in this county.

Eldorado County shows a decrease in output of \$95,657. Some mines, heretofore producers, have stopped work. In other cases properties have made a similar product. There are no very large producers in the county, the greatest amount from any one mine being about \$30,000. Considerable development work is under way, and some of these mines will be producers in the next year.

Fresno County shows a decrease of \$1,362 for the year. Most of the mines are worked on a small scale at Auberry, Dunlap, Letcher, Pollasky, Toll House, and Trimmer. Some copper mines are being opened in the county at present, but the smelters have not been built at the mines, the ore being shipped away for treatment. For this reason no local market has been created for quartz ore for fluxing purposes.

Humboldt County falls off in yield \$11,112 for the year. Most of the mines are hydraulic, the principal ones being at Orleans. Some ocean beach mining is being done at Gold Bluffs, Big Lagoon, and Dows Prairie. At Big Lagoon a dredger has been put at work on the auriferous black sand deposits.

Inyo County shows the material decrease in output, of \$108,169. One of the largest producers in the county the previous year, was closed entirely during 1901. This was at Ballarat camp, where other mines also made a lessened yield in 1901. Some of the mines at Modoc show a decreased yield, as did those at Independence and Keeler.

Kern County increased its output for the year, by \$94,568. This is mainly due to the yield of the mines at Johannesburg, Randsburg, and Havilah. At all these places more mines are being worked and several new properties appear in the lists of producers. The mines of the county are almost entirely quartz and the principal producers are the Yellow Aster, Butte, Napoleon Consolidated, and Stanford, at Johannesburg; the Cræsus, at Johannesburg; the Lida, at Rosamond, and the Mountain King and Fairview, at Havilah. The places where the most mining is being carried on are as follows: Analie, Caldwell, Caliente, Goler, Havilah, Isabella, Johannesburg, Kernville, Mohave, Piute, Randsburg, Rosamond, Searles, Vaughn, Weldon, and White River. The most productive mine in the county is the Yellow Aster.

Lassen County shows a material decrease of \$14,383. The largest producers in the county in 1900 was idle in 1901 and other mines at Hayden Hill made lessened output. Late in the year the Golden Eagle at Hayden Hill, under new ownership and management, has been

developed and exceptionally good ore found, but it made no product for the year under review. It is now being equipped, and is expected to become productive again.

Los Angeles County shows an increase of \$4,804, the increase being from a quartz mine at Quail. In the mines at Acton very little is being done, and there was only a nominal yield from the placers at Newhall.

Madera County shows a decreased yield of \$22,618 for the year. The Gambetta, at Grub Gulch, the most productive mine in the county the previous year, was not in operation last year. It is now under new ownership and has been unwatered. Considerable development work is now going on at Grub Gulch, Coarse Gold, Gold, and O'Neal's. The mines in the county are practically all quartz.

Mariposa County practically trebled its output for the year, and shows an increased yield of \$338,199, which is entirely due to the operations of the Mariposa Commercial and Mining Company, owning and operating mines on the Mariposa estate or Fremont grant. The producing mines operated by this company during 1901 were the Princeton, Mariposa, Louis, and Josephine. There are also 16 mines being operated under leases from the company which produced gold last year. This company employs 210 of the 608 miners employed in the county. It has completed its extensive electrical plant, and its machinery and mills are now run by electrical power, effecting a very great saving in cost. By far the larger proportion of gold and silver coming from this county in 1901 was derived from quartz mines on the Mariposa estate. Mines are being worked at the following places in the county: Baxter, Bear Valley, Coulterville, Hite, Hornitos, Indian Gulch, Lewis, Mariposa, Mount Bullion, and Whitlock. Most of the mines are small producers, and some that formerly made a comparatively large yield have ceased to be productive.

Monterey County has not produced any gold for some years until 1901, when operations were resumed in Los Burros district, on several claims. Between \$13,000 and \$14,000 in gold were produced.

Mono County shows a decrease in yield of \$227,675. The larger properties, such as the Standard Consolidated, Bodie Tunnel, Castle Peak, Sunshine, Crystal Lake, and some others, give smaller returns for the year, which accounts for the reduction in output. The cyanide plants in the county still continue to make good returns.

Nevada County, which continues to be the largest gold producing county in the State, shows an increased yield of \$260,299 for the year, or a total output of \$2,139,176 in gold and silver, the latter being obtained in connection with the gold from the quartz mines.

There are 1,784 miners employed in this county. Some of the best equipped quartz mines are in the county of Nevada—the Empire mines, for instance, being considered the best outfitted property in the State.

Among the gold mines of California the second largest producer is located in this county, and the greatly enlarged yield of this property alone would more than account for the increase in the product of the county for the year. Among the more important producing mines of Nevada County are the following: Empire mines, Grass Valley Exploration Company, North Star, Menlo, Bullion, and Maryland, at Grass Valley; Gaston Ridge, at Gaston; Liberty Hill, at Lowell Hill; Yuba, at Maybert; Champion, Providence, Mountaineer, and Red Dog, at Nevada City; North Bloomfield, Badger Hill, and Cherokee, at North

Bloomfield; Consolidated St. Gothard, at North Columbia; Eureka Lake and Yuba Canal Company, at North San Juan; Omega and Red Cross, at Washington; and Mountain Maid, at Youbet.

Orange County shows an increase of \$1,593, all from the placers around Capistrano.

Placer County decreases its output from the previous year by \$92,640. This is the principal drift-mining county in the State, although quartz, hydraulic, and placer mines are also worked. Some few of the larger drift mines increased their output, while others showed a smaller yield for the year. The main cause of the deficit, however, was the lessened yield of the quartz mines. Placer County gives employment to 1,338 miners.

Plumas County shows an increase of \$34,423 for the year. The largest producer in this county is a quartz mine, though most of the properties are hydraulic or placer. There are many Chinese working the gravel mines in Plumas County.

There is a falling off of \$44,243 in the output from the previous year in Riverside County, the mines at Banning, Perris, Salton, and Walters all having returned smaller yields. The most productive mine is the Iron Chief, at Walters.

Sacramento County is credited with an increase of \$52,585, which is all due to the greater number of drift mines above Folsom. There are two dredgers working in the county. All around Folsom placer mining has been carried on for over fifty years, but it is only of late that the deeper lying gravels in the Blue Ravine region have been exploited. For a distance of several miles there are at present borings being made and shafts being sunk to reach the gravel, which lies about 60 to 75 feet below the surface. This auriferous gravel is then drifted out, hoisted to the surface, and washed in sluices. The character of the gravel is tested by boring machines before the shafts are sunk.

All the ranches, orchards, etc., in the vicinity and on the line of the "channel" have been bought or bonded for drift-mining purposes. In some places the gravel is quite rich. The Blue Ravine and the Gray Wing are the two principal producers, the latter having had spots of exceptionally rich gravel and the whole mass paying well.

San Bernardino County adds \$36,149 to the record of the previous year, the increase being mainly from the mines near Barstow and at Doble. The Coolgardie dry-washing placer camp is tributary to Barstow and has made a good record. Aside from this, the principal producing mines are the Gold Mountain at Doble, the Bagdad and Gentry mines at Ludlow, the Dean & James at Slate Range, and the Rose at Victor. There is shown, by returns, to be 667 miners employed in the county. Less silver was produced at Daggett than formerly, all the work there being now done in a small way by leasers.

San Diego County shows an increase of \$63,557, mainly due to the operations of the Free Gold or Golden Cross mines at Hedges. The mines at Julian and Banner show a smaller output, generally. There are a number of dry washing mines along the banks of the Colorado River near Pichacho and above Yuma. At Pichacho very extensive operations have been commenced on a large reduction and cyanide plant, but as yet this enterprise has not become productive, the plant not being completed.

San Luis Obispo County gives the nominal yield of \$300 from a few placers at La Panza, from which source none was derived the previous year.

Shasta County shows an increase of gold product of \$194,508 and of silver \$256,354, a total increase of \$450,862 for the year over the previous one. The Mountain Copper Company, the largest enterprise in the county and in the State, gives less returns of gold for the year and larger returns for silver. The Bully Hill mines at Winthrop came into the field as producers for the first time this year and add materially to the gold and silver output of the county. Both the Mountain Copper Company and the Bully Hill Company are operating copper mines, but obtain both gold and silver in large quantities from the quartz ores purchased for flux at their smelting furnaces. This circumstance has largely increased the number of quartz properties being worked, as a ready local market for ores is furnished and the mines need no reduction works of their own. For this reason, too, lower grade gold and silver ores than could otherwise be profitably mined are now utilized. The Gladstone mine at French Gulch, owned by the Hazel Gold Mining Company, has under new management again become productive, and the Midas mines at Harrison Gulch (Knob P. O.) have increased their output materially. Very extensive operations are now being conducted in copper mining in this county and several smelters are projected as soon as developments now under way warrant. Electric power plants are being erected which will furnish cheaper power to the mines. Shasta County has 1,707 miners employed at daily wages, and there are many others working claims for themselves or prospecting. Shasta County stands fourth in rank in production of gold and silver, but is the leading county in the State in total yield when all substances are considered. In fact, with its copper values added to the gold and silver output, in 1901 it reached nearly \$7,000,000.

Sierra County shows a decrease of \$86,977 for the year. The Cræsus at Allegheny, and Golf Bluff at Downieville, both show materially smaller outputs, while much less came from the gravel mines at Downieville and the quartz mines at Sierra City. Most of the mines in this county are hydraulic, drift, or placer, but the largest producers are quartz.

Siskiyou County decreased its yield by \$72,932 during 1901. Most of the mines of this county are hydraulic, and a comparatively short water season accounts for the deficiency. There are 1,547 miners employed in this county, it being the fifth in rank in number of men employed. There are many Chinese at work in Siskiyou, almost entirely in the hydraulic or river-bed mines. A number of quartz mines are being worked, but there are none thus far of any great productive capacity, the largest of them yielding less than \$50,000 per annum. The principal mines are the Helena, at Callahan; Fidelity and Jordan, at Cecilville; Cherry Creek and Morrison and Carlock, at Fort Jones; Squaw Creek (or Dewey), at Gazelle; Lowden, at Hamburg; Curley Jack, at Happy Camp; Hazel, at Henley; Yreka Company, at Rollin, and Salmon River Hydraulic, at Sawyers Bar. There is a large number of mines being worked in the vicinity of Black Bear, Callahan, Cecilville, Cottage Grove, Coles, Etna, Fort Jones, Forks of

Salmon, Gazelle, Gilta, Gottville, Hamburg, Happy Camp, Henley, Hornbrook, Humbug, Klamathon, Nolton. Oak Bar, Oro Fino, Rollin, Sawyers Bar, Seiad, Scott River, Somes Bar, Walker, and Yreka.

Stanislaus County decreases its product by \$5,512 for the year. The mines in this county are all drift or placer, and very few men are employed.

Trinity County increases its product by \$99,179 for 1901 over 1900, with 982 men employed. This is essentially a gravel-mining county, yet the largest individual producers are quartz mines. The principal quartz mines are as follows: The Union (or Dorleska) and Yellow Rose of Texas, at Abrams; Blue Jay, Golden Jubilee, and Lawrence, at Carrville; Brown Bear and Lappin mines, at Deadwood, and Chloride-Bailey (or Trinity Gold Mining Company) and Globe, at Dedrick. The largest producers among hydraulic or other gravel mines are: The Indian Creek and Texas Jack, at Douglas City; Compagnie Francaise and Huertevant groups, at Junction City; Sykes, at Trinity Center, and La Grange, at Weaverville. The Sweepstakes Hydraulic Mining Company, at the latter place, put on the market recently for a large sum, made no output in 1901. Extensive works have been built for water supply at this mine.

The mines in Tulare County showed an increase of \$3,838 for the year. They are all quartz and are in the vicinity of White River near the boundary of Kern County.

Tuolumne County, where 1,660 miners are employed, stands fifth in rank among California counties in output of gold and silver for 1901. Its increase over the previous year was \$50,897. The mines are mostly quartz. The principal producers are the New Era, at Carters; Eagle-Shawmut, at Chinese Camp; Confidence, at Confidence; Republican, at Jacksonville; App, at Jamestown; Consolidated Golden Gate and Sulphuret, Neale, and Tanzy, at Sonora; Black Oak and Whittle, at Soulsbyville, and Jumper, at Stent, the latter being the largest producer in the county and one of the largest ones in the State. A great many "pocket" mines are being worked in this county, the output of which is exceedingly irregular, some years being high and other years amounting to nothing. A number of new mines are being opened and equipped. The Eagle-Shawmut now has a 100-stamp mill, and some other properties have extensive reduction works.

In Ventura County very little gold or silver mining is carried on, what there is being in the quartz mines at Gorman and Griffin. An increase of \$1,621 is shown for the year.

Yuba County decreases its gold output for the year under review by \$94,877. The Victor Gold Quartz mines, at Browns Valley, now under new management, materially decreased their yield, owing to much time being taken up with development work to put the mines in good shape.

The decreased output from these mines alone accounts for the decreased county yield. Moreover, at Smartville and other gravel-mining places a smaller yield is shown.

The following table shows the distribution of the total gold and silver product of California, by counties, in the calendar year 1901, based upon returns received from producers, at the mint at San Francisco:

PRODUCT OF CALIFORNIA, BY COUNTIES, 1901.

RECAPITULATION.

County.	Gold.	Silver.	Total.
Alpine.....	\$23,568	\$2,860	\$26,428
Amador.....	1,823,827	7,444	1,831,271
Butte.....	864,978	4,634	869,612
Calaveras.....	2,024,685	44,687	2,069,372
Colusa.....	1,800	.....	1,800
Del Norte.....	10,612	.....	10,612
Eldorado.....	292,036	5,977	298,013
Fresno.....	21,462	.....	21,462
Humboldt.....	98,487	128	98,615
Inyo.....	162,406	56,573	218,979
Kern.....	1,007,059	40,497	1,047,556
Lassen.....	5,900	200	6,100
Los Angeles.....	10,312	.....	10,312
Madera.....	82,749	2,600	85,349
Mariposa.....	504,928	4,787	509,715
Mono.....	493,355	25,091	518,446
Monterey.....	13,800	.....	13,800
Nevada.....	2,121,054	18,122	2,139,176
Orange.....	4,000	.....	4,000
Placer.....	900,745	4,828	905,573
Plumas.....	401,284	2,508	403,792
Riverside.....	109,747	2,150	111,897
Sacramento.....	229,034	544	229,578
San Bernardino.....	399,693	57,164	456,857
San Diego.....	413,320	6,004	419,324
San Luis Obispo.....	300	.....	300
Shasta.....	927,975	891,994	1,819,969
Sierra.....	575,427	755	576,182
Siskiyou.....	886,043	6,408	892,451
Stanislaus.....	15,700	.....	15,700
Trinity.....	684,683	2,668	687,351
Tulare.....	14,616	100	14,716
Tuolumne.....	1,670,368	39,787	1,710,155
Ventura.....	4,183	.....	4,183
Yuba.....	188,908	846	189,754
Total.....	16,989,044	1,229,356	18,218,400

The following table shows in detail, by counties, the source of gold and silver in California in 1901:

SOURCE OF GOLD AND SILVER, 1901.

County.	Quartz.	Placer.	Drift.	Hydraulic.
Alpine.....	\$26,428	.....	.....	.....
Amador.....	1,786,784	\$38,536	\$5,951	.....
Butte.....	218,438	450,752	109,067	\$91,355
Calaveras.....	1,991,850	32,839	7,400	37,283
Colusa.....	1,800	.....	.....	.....
Del Norte.....	.....	9,726	.....	886
El Dorado.....	216,067	53,446	9,800	18,700
Fresno.....	15,800	1,662	.....	4,000
Humboldt.....	.....	13,157	.....	85,458
Inyo.....	216,439	2,540	.....	.....
Kern.....	1,040,056	7,500	.....	.....
Lassen.....	6,100	.....	.....	.....
Los Angeles.....	8,723	1,589	.....	.....
Madera.....	76,299	9,050	.....	.....
Mariposa.....	490,672	13,843	200	5,000
Mono.....	517,546	900	.....	.....
Monterey.....	.....	1,000	.....	12,800
Nevada.....	1,803,017	43,276	109,983	182,900
Orange.....	.....	700	3,300	.....
Placer.....	88,069	89,691	552,802	175,011
Plumas.....	184,076	31,901	24,224	163,591
Riverside.....	111,897	.....	.....	.....
Sacramento.....	.....	91,739	123,839	14,000
San Bernardino.....	370,647	84,310	.....	1,900
San Diego.....	402,324	17,000	.....	.....
San Luis Obispo.....	.....	300	.....	.....
Shasta.....	1,799,578	11,314	1,200	7,877
Sierra.....	295,497	36,326	77,860	166,499
Siskiyou.....	432,859	26,268	15,445	417,879
Stanislaus.....	.....	2,700	13,000	.....
Trinity.....	360,237	80,184	5,558	241,372
Tulare.....	14,716	.....	.....	.....
Tuolumne.....	1,682,891	7,114	1,950	18,200
Ventura.....	4,183	.....	.....	.....
Yuba.....	101,376	32,437	871	55,070
Total.....	14,264,369	1,191,800	1,062,450	1,699,781

The rate of wages paid miners in California varies with the counties and with the class of work. There is no general miners' union with prevailing fixed rates. Underground miners get more than surface workers, and those working on hydraulic, drift, placer, and other gravel mines generally get less wages than those working in quartz properties. The Chinamen receive lower wages than the whites, though they get better pay when working for white men than when working for Chinese companies. Great numbers of them work their own claims individually or by companies, or work leased ground. They do little, if any, underground work in quartz mines, but confine themselves principally to drift, hydraulic, and placer work. They work, however, underground in the drift mines. For these reasons the prevailing rate of wages is generally higher in the counties where quartz mining predominates, and the men receive less daily pay when working in gravel.

In Amador County the prevailing rate is from \$2.50 to \$2.75 per day, some large mines paying at one of these rates and some at the other. In some cases \$3 per day is paid for underground men. There are 1,351 miners employed on wages in this county.

In Alpine County the 46 men employed receive \$3 per day.

In Butte County, where various kinds of mining are carried on, the rate of wages varies greatly. At the largest quartz mine in the county, with 105 men employed, the average rate was \$2.88 per day. In other places the pay was \$2.50, \$2.55, and \$2.75. At some gravel mines they pay \$1.50 and board, and in others \$2 and board. At a few mines the pay is \$65 per month and board. There are 915 men employed in the mines and on the dredges, about 200 more than the previous year.

According to the returns received at the United States mint at San Francisco, there were 1,884 miners employed in Calaveras County in 1901, the largest number of any county in the State. The Utica, Lightner, Gwin, Royal Consolidated, Sheep Ranch, Melones, and Penn mines combined have 1,258 men at work, the rest being employed in the smaller mines of the county. Generally, the wages are \$2.50 for outside men and \$3 for miners. At the largest camp—Angels—the \$3 rate prevails, but in many places \$2.50 per day is paid. Chinese get \$1.50. As showing proportion of output to number of men, it is to be noted that the two leading gold-producing counties—Calaveras and Nevada—employ the largest number of miners.

In Del Norte County, where there are only gravel and beach sand mines, the wages are \$2.50, or \$2 and board.

El Dorado County, with 767 men at work, pays generally \$2.50, but at some mines \$2.75 and \$3 is paid. At some placer mines \$2.25 is paid, and at some quartz mines the average rate is \$2.88. In Fresno County the rates vary from \$1.50 to \$2.50 per day. In Humboldt, where they have mainly hydraulic or ocean-beach sand mines, wages vary from \$35 to \$50 per month and board. Some beach mines pay \$1.50 and board and some \$2. In Inyo County the prevailing rate is \$3 per day. Kern County, with 977 men at work, pays at the largest mines an average rate of \$3 per day, but at some places the pay is \$2.50, or \$2 and board. In Lassen County the general rate is \$2.50, and in the few mines in Los Angeles \$2.50 to \$3. In Madera, according to class of work, it is \$2.50, \$2.75, and \$3. In the largest mine in Mariposa County they pay \$3 to miners and \$2.50 to "muckers." In a few camps they pay \$1.50 to \$1.75 per day and board.

Mono County pays the highest average rate of all the counties, it being \$4 per day in the larger mines. In some mines they pay from \$2.50 to \$3 and board. There are 408 miners employed at wages.

Nevada County, with 1,784 miners employed, pays \$2.50 to \$2.75 and \$3, the latter to miners in most of the quartz camps, shovelers and car men getting lower rate. In most of the hydraulic mines a lower rate is paid, the Chinese getting less than the whites invariably.

The few miners in Orange County receive \$2.50 per day. Placer County, with 1,338 men employed, has quite a varying rate, owing to the different classes of mines. In some of the larger drift mines whites will average \$2.65 and Chinese \$1.75 per day. In the quartz mines men receive \$2.50 to \$3, and in some places the men get \$2 and board. In the largest drift mine, with 180 men employed, the average rate, including whites and Chinese, is \$2.20 per day.

Plumas County, also, has quite a varying rate, according to the class of mining. In the larger quartz camps the pay is \$2.75 to \$3. In gravel camps they pay from \$1.75 to \$2 and board, or \$2.50; the Chinese get \$1.75. In some places the pay is \$40 per month and board. In Riverside County they pay wages from \$2.50 to \$3 per day. In Sacramento County they range from \$1.75 to \$2.50, the former being for Chinese. On the dredgers the men get \$62.35 per month and board. In San Bernardino County the general rate is \$3 per day, while in some camps the men get \$3.50 and even \$4. San Diego County pays \$2.50 to \$3.

In Shasta County, with 1,707 men employed, the pay is \$2.50, \$2.75, and \$3, according to class of work. At some places they pay \$2 and board, or \$50 per month and board. At one of the larger mines the pay is \$2.50 for car men, \$2.75 for miners, and \$3 for machine men. In Sierra County the general average is \$3 per day.

Siskiyou County has the most varying rate of any of the counties and probably has more Chinese at work. There are 1,547 miners at work. The largest quartz mine pays \$2.75. In some camps the pay is \$40 to \$45 per month and board and \$2.25 per day with an allowance of \$5 per week for board. In some camps they pay \$1.50 to \$2 and board, the Chinese getting the lower prices. In a few camps the pay is \$50 per month and board, but in most of them a flat rate of \$2.50 per day for miners prevails. In Stanislaus County the wages are \$2.50 per day.

Trinity County, with 982 miners at work, pays, generally, \$2.50 per day to miners, although in a few places the pay is \$3. In some places they pay \$45, \$50, and \$60 per month and board. The Chinese work for Chinese at \$20 per month, but get higher wages working for whites. At some camps the whites get \$2 and board instead of \$2.50 cash. Tulare County pays \$2.50 per day. Tuolumne pays, generally, \$2.75 to \$3, the latter price being paid at the larger quartz camps, though at some of them \$2.75 is the rate. In Ventura County the pay is \$3. In Yuba County wages vary from \$2.50 to \$3, the latter at the quartz camps. At some gravel mines they pay \$2 and board.

The appended table shows, by counties, the number of men employed in gold and silver mines in California during 1901 and also those at work in copper mines or lead mines which produced gold and silver. The table is made from returns to the United States mint at San Francisco by producers, postmasters, gold-dust buyers, and others in the different camps. This covers those regularly employed in mining or

working for themselves, but does not include prospectors not directly employed in working mines.

MINERS EMPLOYED IN CALIFORNIA, 1901.

County.	Number of men.	County.	Number of men.
Alpine.....	46	Orange.....	15
Amador.....	1,351	Placer.....	1,338
Butte.....	915	Plumas.....	570
Calaveras.....	1,884	Riverside.....	213
Colusa.....	3	Sacramento.....	241
Del Norte.....	46	San Bernardino.....	667
Eldorado.....	767	San Diego.....	418
Fresno.....	128	Shasta.....	1,707
Humboldt.....	113	Sierra.....	935
Inyo.....	288	Siskiyou.....	1,547
Kern.....	977	Stanislaus.....	20
Lassen.....	45	Trinity.....	982
Los Angeles.....	55	Tulare.....	27
Madera.....	178	Tuolumne.....	1,660
Mariposa.....	608	Ventura.....	20
Monterey.....	20	Yuba.....	229
Mono.....	408		
Nevada.....	1,784	Total.....	20,205

The following table shows the source of production of gold and silver as to quartz, placer, copper, and lead ores. The placers include surface placers, hydraulic and drift mines. In the table previously given in this chapter as to distribution by quartz, drift, hydraulic, and placer mines the gold and silver are both included in the figures and these metals derived from working copper and lead ores are included in the quartz. In the following table both gold and silver are reported as to exact sources.

Source.	Gold.		Silver.	
	Standard ounces.	Value.	Standard ounces.	Coining value.
Quartz.....		\$12,499,743		\$249,616
Placer.....		3,951,049		2,982
Lead.....		116,867		60,925
Copper.....		421,385		915,833
Total.....	913,161,122	16,989,044	1,056,510.82	1,229,356

The entire mineral product of California for 1901, including all mineral substances and their value, is shown in the following table from Bulletin No. 25 of the California State mining bureau:

TOTAL MINERAL PRODUCT OF CALIFORNIA FOR 1901.

Description.	Quantity.	Value.
Antimony.....tons..	50	\$8,350
Asbestos.....do.....	110	4,400
Asphalt.....do.....	21,364	312,219
Bituminous rock.....do.....	24,052	66,354
Borax (crude and refined).....do.....	22,221	982,380
Cement.....do.....	71,800	159,842
Chrome.....do.....	130	1,950
Clays:		
Brick.....M.....	130,766	860,488
Pottery.....tons..	55,679	39,144
Coal.....do.....	150,724	401,772
Copper.....pounds..	34,931,785	5,501,782
Fullers' earth.....tons..	1,000	19,500

TOTAL MINERAL PRODUCT OF CALIFORNIA FOR 1901--Continued.

Description.	Quantity.	Value.
Glass sand.....pounds..	4,500	\$15,750
Gold.....		16,989,044
Granite.....cubic feet..	214,943	519,285
Graphite.....tons..	64	4,480
Gypsum.....do..	3,875	38,750
Lead.....pounds..	720,500	28,820
Lithia mica.....tons..	1,100	27,500
Lime.....barrels..	317,383	334,688
Limestone.....tons..	76,937	99,445
Macadam.....do..	360,883	313,974
Manganese.....do..	425	4,405
Magnesite.....do..	4,726	43,057
Marble.....cubic feet..	2,945	4,630
Mineral paint.....tons..	325	875
Mineral water.....gallons..	1,555,328	559,057
Natural gas.....		92,034
Paving blocks.....M..	1,920	41,075
Petroleum.....barrels..	7,710,315	2,961,102
Platinum.....ounces..	250	3,200
Pyrites.....tons..	4,578	18,429
Quartz crystals.....pounds..	4,000	17,500
Quartz, sand.....tons..	500	500
Quicksilver.....flasks..	26,720	1,285,014
Rubble.....tons..	169,513	327,063
Salt.....do..	126,218	366,376
Sandstone.....cubic feet..	226,741	192,132
Serpentine.....do..	89	890
Soda.....tons..	8,000	400,000
Silver.....		1,229,356
Slate.....squares..	5,100	38,250
Soapstone.....tons..	10	119
Turmaline.....pounds..	500	20,000
Tourquoise.....do..	500	20,000
Total.....		34,355,981

In the previous year the total product was valued at \$32,622,945, so that the increase for 1901 is \$1,733,036.

COLORADO.

By JAMES L. HODGES,

Assayer in charge, United States mint, Denver, Colo.

The value of Colorado's production for 1901 is as follows:

Gold (at \$20.67 per fine ounce).....	\$27, 756, 313
Silver (coining value at \$1.29 per ounce).....	23, 992, 977
Lead (at \$0.04334 per pound).....	6, 419, 130
Copper (at \$0.16555 per pound).....	1, 471, 923
Total.....	59, 640, 343

The decreases from the preceding years are:

Gold.....	\$1, 113, 079
Silver.....	3, 005, 951
Lead.....	369, 102
Copper.....	71, 897
Total.....	4, 560, 029

This falling off in production is attributed to the fact that, while the tonnage of gold and silver ores increased, the grades notably declined. In the Cripple Creek district the smelting grades averaged a decline of \$10 per ton. The chemical-mill product of the district, almost entirely chlorination, returned \$27.64 per ton. The State's chlorination product increased in value over \$2,000,000, while the cyanide bullion decreased \$1,500,000. The latter incident was due to the closing down of the Metallic Extraction Company's big cyanide plant, which had been for the time being superseded by a 400-ton concentrating plant to treat the accumulated dump of probably half a million tons.

The silver ore tonnage of the State has suffered comparatively little diminution from its best records, but the grades have steadily declined. Bonanza silver ores, such as once made famous heavy producers of Aspen, Leadville, Creede, and Marshall Basin, are now memories only to the State's smelters.

Rumors of arbitrary quotations, which would cut the prices paid for lead and copper, especially during the last quarter of the year, curtailed somewhat the output of these ores, as did a more or less aggressive difference, in instances, as to the provisions of contracts for the coming year.

TREATMENT CHARGES.

In December the consolidated smelters and united milling plants announced a change in treatment charges for Cripple Creek ores which amounts to a reduction of from 50 cents to \$1 per ton on \$8 to \$8.50 per ton ores and an increase of about \$1.50 per ton upon higher grades. Ores of about \$8 per ton largely predominating in run-of-the-mine products, a number of properties of magnitude will profit considerably by the change.

FUTURE OF LOW GRADES.

The future of mining in Colorado unmistakably points to marvelous tonnages of low grades, which will swell the aggregate of values, and the chemical processes of treatment are rapidly being perfected to profitably handle these bodies. Scientifically economical mining and milling on a large scale is the order of the day, and in no region is this more conspicuously exemplified than throughout the great San Juan country of Colorado, which, with a permanent understanding established between capital and labor, will wonderfully increase its already gigantic contributions to the mineral wealth of the world.

ZINC PROBLEM SOLVED.

The successful operations of distinctive plants for treating the State's zinciferous ores was an important feature of the year, and the assured erection of a large smelter at Pueblo adapted to just such ores will provide a market for large ore bodies of Leadville, Crede, Rico, and other districts.

PLACER PREPARATIONS.

While the actual results in values obtained from placer operations have been very modest, preparations on an extensive scale have occurred in Summit, Park, San Miguel, and other counties, which should result in a very wholesome gain in placer values in 1902.

EXCELLENT RAILWAY FACILITIES.

The mining camps of Colorado are admirably served in the main by the various railroads, the Denver and Rio Grande's policy for years having been to build into new districts as speedily as justified by ore conditions, and it has very materially contributed to the prosperity of the State's mining industry.

In passenger, freight, and ore tonnage facilities provided the Rio Grande, Midland, Colorado Southern, Colorado Springs Short Line, and other transportation companies have arisen adequately to the situation.

A résumé of the year's work in the more important mining counties follows:

BOULDER COUNTY.

Boulder County is situated in the central northern part of the State and embraces an area of about 700 square miles.

Two railway systems give easy and rapid transportation for the county's varied and prolific products.

The gold production for the year has increased, while the silver production remains about the same. The character of the ore is heavy sulphides and rich tellurium.

Steam is the principal motive power, coal being used for fuel.

The mines as a rule are comparatively dry, but little pumping being required.

No new districts of importance have been discovered during the year.

BOND AND LEASING SYSTEM.

The bond and leasing system is increasing in popularity and shows good results throughout the county. On straight leases 10 per cent royalty, and on bond and lease 25 per cent prevails. About 2,000 miners were employed during the year.

WALL STREET.

This district has been the scene of great activity during the year. Old and new mining companies have been steadily at work with the most gratifying results. The ore is rich tellurium and holds its values well with deeper explorations.

The Colorado and Northern Railway gives transportation to the smelters, which treat most of the ore.

The Wall Street Gold Extraction Company is erecting a chlorination plant with a capacity of 100 tons daily. With the promised reduced treatment charges of this local mill the camp should add largely to its output of low-grade ores during the coming year.

The largest producers in the district are the Lucky Star, Tambourine, Gladys, and Richmond.

To the west of Wall Street are the sulphide camps of Sunset, Copper Rock, and Puzzler. Considerable development work and prospecting is being done with satisfactory results. The Wood Mountain Company is keeping its mill steadily at work on a good class of ore.

WARD DISTRICT.

Ward is the center of one of the richest sulphide sections in the county. The ore bodies are large, ranging from 2 to 12 feet in thickness.

The milling ore averages \$12 and the smelting about \$40. Owing to the desire of several large mining companies to enlarge their territory and negotiating for the same, the production of the camp has been restricted. With the consummation of these deals and results from the large tunnel companies now developing, the district should certainly make a good showing in the near future.

GOLD HILL.

Active mining is going on in this district. The Coldstream property is producing a wonderfully rich tellurium ore and is one of the largest shippers. The Prussian, Slide, and several of the old mines are producing steadily.

ELDORA.

This district is noted for its rich tellurium and sylvanite ores.

Owing to lack of local treatment all ore has to be hauled by wagon to Boulder, a distance of 22 miles. The heavy freight charges permit only the high-grade ores to be shipped, while hundreds of tons of mill dirt are thrown on the dumps.

The Mogul tunnel in Spencer Mountain, has been steadily pushed, and many fine veins have been cut.

Two new tunnel companies have begun work in Spencer and Chitenden mountains to cut the large veins known to exist. Active prospecting is the rule throughout the district.

The Eldora chlorination mill, which is well equipped with costly machinery, has been closed during the year owing to litigation.

The chlorination process successfully treated the ores, and the shutting down of the local mill has been a great drawback to the camp.

CHEAPER TRANSPORTATION REQUIRED.

The great need of the district is cheaper transportation to the smelter and mills. With railroad facilities this section would assume its proper place as one of the largest producing districts in the county.

The Revenge, Fourth of July, Enterprise, and Mogul Tunnel have produced steadily during the year.

The Kilton Sampler, 75 tons' capacity, and the Chamberlain, 70 tons, at Boulder, handle most of the county's ores; the rest is treated by cyanide and chlorination mills, locally.

MILLS IN OPERATION.

	Tons per day.
Cold Spring, Rowena.....	100
Gale, Rowena.....	60
Logan, Ward.....	10
Nellie Bly, Wall Street.....	100
Wood Mountain, Wall Street.....	40
Livingston, Sunshine.....	20
New Century, Jamestown.....	50

The coal production was 496,111 tons, giving employment to about 1,600 men.

PETROLEUM DISCOVERY.

Great excitement has been caused by the discovery of petroleum two miles east of Boulder City. The oil was found at a depth of 2,600 feet and is of a fine paraffin quality. The future will demonstrate the extent and value of the discovery.

CHAFFEE COUNTY.

Turret is a comparatively new district, consequently its mining claims have as yet limited development.

The Independence vein is being opened through an inclined shaft. The vein filling, which is between solid walls, carries an ore of copper with good values from grass roots.

The two owners are doing all the work alone. Shipments, although small, have paid costs of development. As depth is gained the mineral is said to carry a higher value. Recently a shipment of three carloads was made and now eight cars are being loaded with high-grade ore.

VESPER GROUP.

Vesper group of eight claims, on Vesper Mountain, is owned and operated by the Vesper Gold Mining Company. The vein is in granite, with porphyry underlying the line. The ores are mainly black copper sulphides, rich in gold. Arrangements are made for enlarged operations.

TWIN CITY COMPANY.

Twin City Development Company owns a group of twelve claims, comprising 109 acres. The bulk of development is being done on the Gertie vein. Its working shaft is now at a depth of 120 feet, is verti-

cal, and in two compartments. When a depth of 150 feet is attained cages will be placed.

VIVANDIERE.

Vivandiere is equipped with a steam hoist, separate engine, air compressor of 6 drills, capacity, and power fan for ventilation of the mine. Shaft has a depth of 600 feet. The vein is large and well defined between granite walls. This shaft inclines to a depth of 250 feet, thence to the bottom is nearly vertical. Twenty-five men are employed mining and preparing premises for enlarged operations.

The recent shipment of 5 carloads to the smelting works gave net returns of \$60 per ton. Five more cars of ore are en route and contracts made for shipment of 2 carloads each week.

HOLDREDGE MINING AND MILLING COMPANY.

The Holdredge Mining and Milling Company has eight claims, of which the Holdredge is at present most actively worked. Shaft is 85 feet deep; tunnel, 300 feet. Ore in various places assays from \$27 to \$229.60 per ton.

The Holdredge vein has a width varying from 2 to 6 feet; walls well defined on solid sulphides.

The Holdredge group is in a country-rock formation of schist, with dikes of porphyry, quartzite, spar, and cyanite. Character of ore is hematite of iron carrying free gold and a sulphide consisting of iron and copper pyrites.

The opportunities for conducting mining operations on an economical basis are very favorable. Mouth of tunnel is 150 feet distant from Denver and Rio Grande Railroad.

SMELTING PLANT NEAR SALIDA.

The Ohio and Colorado Smelting and Refining Company, a new organization with capital in treasury equal to all financial requirements, is now erecting a smelting plant of an initial ore capacity of 600 tons per day, which is believed to be safely within the tonnage in sight, yet the plans are so prepared that furnaces for 800 to 1,000 tons per day may be added to the plant without interruption.

The plant is located at a point about 2 miles out from Salida, with switching tracks laid from the Denver and Rio Grande Railroad.

NEW MONARCH MINES.

The Ohio and Colorado Smelting and Refining Company will resume and enlarge operations on their New Monarch mines in the Leadville district, which property has been practically idle for some six months, due to a congested ore market; also some differences as to treatment charges.

This company proposes to treat not only its own ores, but will enter the market as purchasers of the outputs from other mines; also products from matting furnaces. The management states that it hopes to commence receiving ore early in the month of April, 1902.

CLEAR CREEK COUNTY.

The year 1901 may be justly recorded as Clear Creeks most prosperous one. Not since 1893 has there been exhibited such marvelous

efforts reaching out for good as during the year just passed, when its gold production for the first time exceeded the silver output. Discouraged as was the population of this county by the blow to its chief industry in 1893, it has proved the old adage that "necessity knows no law," and through almost superhuman efforts has converted the county from a banner silver producer to a distinctively gold-producing one.

In no portion of Colorado is the vim of effort more plainly visible than in this county. New workings are the order of the day, and on every hand, from East Argentine (commencing at the apex of the Continental Divide at Argentine Pass, 12 miles above Georgetown), to Floyd Hill, 32 miles down the canyon, are to be seen the evidences of the wonderful regeneration going on in the production of the precious metals.

INQUIRING CAPITAL.

It is estimated by conservative operators that upward of \$1,000,000 have come into the county for investment during 1901.

New enterprises are constantly being inaugurated, and those in contemplation are the talk of the hour.

Every camp in the county surpassed all previous records for the year. Capital and labor, the two essentials for commercial success, have been in entire harmony.

ROSTER OF CAMPS.

The county covers the following-named camps: East Argentine, Georgetown, Silver Plume, Empire, Dumont, Lawson, Lamartine, Freeland, Idaho Springs, Fall River, Spring Gulch, and Soda Springs. In all of these there is still left ample ground for the prospector, and inducement to capital.

Idaho Springs has become the center of treatment for the product of the county, and the hum of active operation is heard in the following mills:

SAMPLING MILLS.

	Tonnage.
W. J. Chamberlain & Co	100
Denver Mining and Smelting Company	80
State Ore Sampling Works Company	50

CONCENTRATION WORKS.

Silver Age	60
Wilkie	40
Mixsell	30
Allan	50
Newton	110
Little Mattie	60
Lincoln	30
Salisbury	60
Jackson	75
Donaldson	60
Golconda	10
Humboldt	10
New Era	35
Standard	60
Bertha	40
Smith	60
United Gold	25
Idaho Springs Mining and Refining Company	125

Total daily capacity 940

These mills operate every day in the week and yet are unable to treat the tonnage of the mines. During the year past many cars were shipped out for treatment at other mills.

Situated, as Idaho Springs is, with ample water to be had, there is no reason to fear that she will prove unequal to the emergency, and her milling capacity will be increased sufficiently to care for all the ore that may come to her.

MILLS SAVINGS.

The savings made in the mills mentioned average approximately 85 per cent of the assay value.

The general character and values of the ores of the various districts have been maintained during the year.

The mines, generally, are not much bothered with water. Such as there is is taken care of in the usual way, either by pump or bucket.

STRAIGHT LEASING.

Leasing prevails to a large extent on the straight plan, the royalty ranging from 10 to 40 per cent. Many developed properties are bonded and leased by promoters, and in this way find their way into large, capable companies. Contiguous ground is acquired in a similar way, the acreage then added to the parent company, and thus larger operations permitted. The royalty, under bond and lease, is generally much less than under the straight plan.

POWER FACTORS.

Steam is the general factor in the mining operations of the county. Some little electricity is used in the mills of Idaho Springs.

Many changes are contemplated, and the introduction of electricity will be utilized largely in the near future.

FUEL.

All fuel comes from the valley, and averages from \$5 to \$7 per ton.

A SINGLE CHEMICAL PLANT.

There is but one chemical plant to be found in the county, on Chicago Creek, 1 mile above Idaho Springs. It was constructed to handle the tailings from the Black Eagle mine, is of the cyanide order, and much is expected of it. Should it prove a success, cyanide introduction will be largely increased.

GREAT TUNNELS.

Perhaps the greatest innovation in mining in any section of Colorado's mineral belts is to be found in Clear Creek County, in the installment of the following great tunnels designed to run long distances and tap at great depth the wonderful mines of their respective districts. First comes the Newhouse, to run 5 miles; Central, 5 miles; McClelland Monarch, 4 miles; Burns-Moore, 6 miles; Lucannia, 2 miles; Kelly, at Georgetown, 2½ miles; Denver-Salt Lake, cutting the Continental Divide, underneath Grays Peak, via Kelso Mountain, making a gateway through the Rocky Mountain range for railway

usage, $4\frac{1}{2}$ miles. The completion of these great enterprises constitutes a wonderful work, and illustrates the confidence which capital has in Clear Creek County.

SILVER PLUME.

The Colorado and Southern Railway reaches Silver Plume, the western settlement of Clear Creek County. It is a narrow gauge and enjoys profitable patronage in its 57 miles.

The gross output of the county for 1901 was as follows: Gold, \$955,200; silver, \$906,313; lead, \$175,072; copper, \$46,926; total, \$2,083,511.

Number of mining locations in the county January 1, 1902: One thousand and sixty-one lode claims, 44 tunnel sites, 79 mill sites.

GOLDEN PYRITIC PLANT.

At the mouth of the canyon, at Golden, leading to the great camps of Clear Creek and Gilpin, a new industry has been founded. This consists of a smelter designed especially for the treatment of the iron pyrites of Gilpin and Clear Creek counties. As an evidence of its success it can be stated that already plans are under way to double its capacity. This will greatly aid the operators of the counties named, in that it will permit them to market a product that hitherto has had no value in the development of their properties.

THE YEARS' PRODUCERS.

East Argentine district has been the scene of much activity during the year. The opening of the Santiago, Commonwealth, Paymaster, Mendham, and other fine properties is adding largely to the product of the county. The Terrible, Dunderbury, Dives and Pelican, Dunkirk, Brooklyn, Seven-Thirty, Baltimore Tunnel, Mendota, and other great mines at Silver Plume and Brownville kept up their reputations for steady and reliable producers.

The Aliundi, Centennial, Magnet, Welch, Edinburgh, Little Emma, Silver Glance, Mint, and others at Georgetown have been large and steady producers.

DRY CONCENTRATING MILL.

At Yankee Hill the Alice, Lombard, Cumberland, Niagara, and others are actively in operation, and the camp has the only dry concentrating mill in the State. It is the Waugh process, and a vibrating table is used, covered with flannel, and this is vibrated with an under-air pressure sufficient to separate all metals from the silica. The ore is crushed and then run into a heated revolving cylinder, which perfectly dries it. The mill has just been completed and much is expected of it. Its test run was pronounced very satisfactory.

OLD LAMARTINE.

At Lamartine the Old Lamartine is steadily outputting a large product.

At Freeland the Freeland property is under tribute, and the outlook for this old-time producer is greater than ever.

The Mattie-Wild Rose group is in good ore.

In the district between Idaho Springs and Russell Gulch, the Crown

Point, General, Grover Cleveland, San Francisco, Amy C., Seaton, and many others are all under active operation.

The prospective producers of the camp are being vigorously developed and the coming year will see many of them go into the shipping contingent.

DOLORES COUNTY.

The county of Dolores, with Rico as its county seat and distributing center, is unique in geological importance, because of the fact that in diversified structure it is surpassed by no similar area in the United States. Exceeding sixty distinct elements have been found in varying quantity within its borders. The mountainous districts of the eastern part of the county exhibit gigantic rock formations indicative of gradations from the Lower Silurian to the Post-Tertiary age. A number of these massive deposits outline the regular strata while others are seamed with dikes and layers of igneous rock running about the entire gamut of porphyritic classification.

The districts to the west more nearly illustrate the sedimentary period, with very much less volcanic disturbance, but a number of plutonic dikes and a granite cap of magnitude belt this section, the latter marking the county between the West Dolores and Beaver Creek and forming the crest of the watershed for a considerable distance between the streams.

DIVERSIFIED MINERALOGY.

The point of contact of these sedimentary and igneous formations marks the mineral deposits, including gold, silver, copper, lead, zinc, iron, aluminum, manganese, sulphur, uranium, radium, vanadium in quantity, while the unmistakable presence has been proven of cobalt, tungsten, nickel, and many of the rarest elements of scientific knowledge.

Coal of good quality exists in large fields.

Tributary to West Dolores are extensive sulphur beds, carrying from 50 to 75 per cent sulphur, and sulphate of calcium or gypsum finds lodgment in Disappointment Valley (in the same district), in veritably inexhaustible amount. High-grade graphite and plenty of it, easily accessible to railroad, lies in beds round about Lizard Head, while a few miles beyond Rico, near Coke Ovens, are vast quantities of beauxite, readily adapted to the manufacture of commercial aluminum.

A MARKET FOR ZINCIFEROUS ORES.

For many years the Dolores County metalliferous mines suffered severely from the presence of zinc in their ores, Colorado smelters levying very largely against it as a gravely disturbing element, and a vast tonnage of such product in this section has thus proven practically valueless, but recent metallurgical processes have materially removed the ban from these zinc grades and gradually opened up a convenient market therefor.

Belgium and Mineralpoint, Wis., have been common points of Rico zinc ore shipments in the past.

The Rico Mining and Milling Company's concentrating plant, which was established within the year for the special treatment of zinc-lead ores, has proven equal to the claims of Dr. H. F. Campbell, of Boston,

inventor of the process and designer of the plant, and an increased capacity for it of 200 tons daily is being provided.

This long-needed plant is erected on the Atlantic Cable vein, controlled by the mill company under bonded lease, and is operated by power electrically applied. The ore is extracted through a 500-foot tunnel running from the mill level, and occurs in blanket formation of iron, zinc, and lead constituents 8 to 10 feet thick and about 70 feet wide.

The mill's zinc product carries about 1 per cent lead and 4 per cent iron. Copper is secured as a by-product.

ZINC MILLING EQUIPMENT.

The mill's equipment is substantial, including 20 stamps, 6 Wilfley tables, 1 roaster, and a line of the inventor's magnetic separators, which cleanly part the lead from the zinc and iron and the iron and copper from the zinc.

Two grades of lead concentrates come from the Wilfleys, the zinc-iron residue being treated by the roaster, thence going to the magnetic separators, the zinc concentrate averaging a \$20 valuation on board the car.

THE MARKET AT PUEBLO.

The announcement of the American Smelting and Refining Company of its purpose to speedily construct and adequately equip a plant at Pueblo for handling the State's zinciferous ores will mean a great deal for Dolores County, and the news is received very cordially at Rico. It has already reenlisted the somewhat flagging interest of formerly large operators and new capital is inquiring into the offerings of Dolores territory.

CONSOLIDATION OF MAGNITUDE.

Equally if not more reassuring to the Rico mining district is the projected consolidation of practically all the developed properties under the name of the United Rico Mining Company. The capitalization is \$3,600,000, and the directory includes some of Colorado's best-known and wealthiest mining operators, as well as a number of Eastern capitalists at present identified with the largest corporations of the country.

This consolidation follows some nine years of bitter and expensive litigation, the contending interests in that time being only able to mine, under court authority, certain accessible beds in the upper ore zones.

In the spring of 1902 extensive development will be entered upon by the new company and enlargement of smelter and milling facilities follow.

PROPERTIES CONSOLIDATED.

The Rico-Aspen, Enterprise, and other noted producers of the past will form the main holdings of this consolidated investment, although its possessions will include more than 1,000 acres, with present underground workings over 50 miles in length. Among the properties included are the Rico-Aspen, Enterprise, Rico Townsite and Milling Company, Swansea, Atlantic Cable, Rico Mine Company, and smelters of 150 tons, with mill of 100 tons daily capacity; Grand View, New Year's, Hope and Cross, the Group, Lexington, Onomo, and Syndi-

cate tunnels, and the Grand View Coal Company, whose holdings comprise a half section of coal lands and coke ovens.

THE YEAR'S RESULTS.

The actual output of the mines during 1901 was necessarily small, owing to ore problems and litigation above recited, and the results show a loss of 10 per cent in gold-silver ores and a corresponding gain in lead-zinc grades.

The Pro Patria Company has driven a crosscut tunnel 2,600 feet on the western slope of Dolores Mountain, cutting a large number of highly mineralized veins drifting extensively thereon. Some are of the Enterprise system, notably Jumbo Third, 2,400 feet from the tunnel's mouth and 1,100 feet below surface. Its values include gold, silver, lead, and zinc, the lead yielding about 25 per cent and the ore aggregating a worth from \$20 to \$30 per ton.

The tunnel will connect with a 100-ton concentrating plant by means of a 3,800-foot tramway with a 15 per cent fall. Lead values will ensue as a jig product, and the iron and zinc tailings will be reground and the iron magnetized by roasting. The magnetic separator will then part the iron and zinc.

THE EMMA MINE.

A Krupp mill of 80-stamp capacity has been added to the 20-stamp mill of the Emma mine, whose chief producing vein ranges from 10 to 15 feet, and carries a main level from a point close above the river level to a distance exceeding 3,000 feet without break or fault in the ore measure. The pay streak proper runs from \$125 to \$600 per ton, and ranges in width from 6 inches to 4 feet, and also discloses in juxtaposition a concentrating lode from 12 to 20 feet wide, averaging \$35 per ton.

DEVELOPED PROPERTIES.

Among the properties which have been principally limited to development work during the year are the Grand View, Hope and Cross, Wellington—with its fine smelting ore of predominating lead and iron carbonates—Argentine, Mediterranean, Rico-Aspen (by leasers), Smuggler-Almont.

GILPIN COUNTY.

The kingdom of Gilpin, in the completion of her forty-second year of production, has eclipsed former records, and stands one of the most reliable of Colorado's mining districts. The year 1901 was favorable, from the fact that no untoward events happened to retard steady working.

Much capital has come into the county during the year and many new finds of ore have been made. Old workings of years ago are being reopened, and are under leasing tribute. While there has been no boom in any of the districts of the county, a steady and increasing interest has been noted in all sections.

SAME TREATMENT METHODS.

There have been no innovations in the way of cheapening processes introduced. The mill dirt is handled under stamp process, as of old, and the smelting grades of ore go to the valley smelters for treat-

ment. Just why the old methods should remain in vogue it is not for the writer to determine. That the county could vastly increase its savings is a belief held by a large majority of the men who operate the mines, and still they go on in the beaten paths that prevailed thirty and forty years ago.

NEW PROCESSES PROBABLE.

That modern ideas will soon prevail is beyond question. The introduction of up-to-date appliances must come. Her territory warrants everything of the best. Situated but 37 miles from the capital of the State, practically outside of the great snow belt, Gilpin County is one of the most accessible mining districts of the State.

Central City, the county seat, and Black Hawk, are thriving seats of industry, equipped with the necessary mercantile houses for the conduct of mining business in general.

MINING DISTRICTS.

The mining districts of the county are: Quartz Hill, Lake Russell, Chase Gulch, Perigo, Eureka, Nevada, Enterprise, Central, Pine Creek, and Yankee.

WELL-KNOWN PRODUCERS.

The mines known for their long, continuous production are: California, Gregory-Bobtail, Kansas-Burroughs, Hidden Treasure, The Wood, Chemung, Nottaway, Concrete-Consolidated, Leavenworth, Delaware, Centennial, Old Town, Saratoga, Alps, Gold Dirt, Perigo, Ontario-Colorado, Freedom, Boston, East Boston, Mackey, Patch, Mingo, Carr, Grace Darling, Grand Central, Katie, Moon, South Moon, and Klondyke.

GREATEST DEPTH REACHED.

A healthy increase of development is steadily going forward. The greatest depth attained in the county workings is that of the California mine, on Quartz Hill, which has reached 2,250 feet. Many of the workings have reached from 400 to 1,600 feet, and sinking proceeds.

Deep mining has proven more valuable than operations near the surface.

The consolidation of contiguous properties is a factor in increased production.

LEASING SYSTEM.

The leasing system is very much in vogue in all districts. It permits men of limited capital to rent blocks of ore-bearing ground in well-developed mines at fair royalties—10 to 30 per cent.

FREE-MILLING ORES.

The ores of Gilpin County are semifree-milling, and the little city of Black Hawk has well earned its title of "Mill City." For upward of forty years the thump of the stamps has here been heard, and each year adds to the number.

MILLS IN OPERATION.

The following-named mills, all located at Black Hawk, unless otherwise mentioned, are in operation and all doing fairly good work:

Fullerton, 33 slow stamps; Hidden Treasure, 75 slow and 10 rapid stamps; Mead, 40 slow stamps; Polar Star, 40 slow stamps; Eagle, 35 rapid stamps; Gilpin, 50 slow stamps; Rocky Mountain, 25 slow stamps; New York, 50 slow and 20 rapid stamps; Randolph, 50 slow stamps; Iron City, 25 rapid stamps; Perigo, Gamble Gulch, 35 rapid stamps; Peterson, Success Gulch, 15 slow stamps; Avon, Nevada Gulch, 30 rapid stamps.

The above shows 533 stamps dropping on Gilpin County ores to-day; 378 are slow and 155 quick drop.

It is the consensus of opinion among the mining men of the county that the rapid-drop stamp is a failure on the county ores.

An average of 750 tons of ore are crushed daily, apportioned as follows: Six hundred and fifty tons at Black Hawk, and 100 tons at Perigo, Nevada Gulch, and Lump Gulch. This tonnage, in connection with ores shipped direct to smelters and crude ores sent to Golden and Idaho Springs, brings the daily product of the county up to between 1,000 and 1,100 tons.

ALSDORF CONCENTRATOR.

Much is expected of the Alsdorf concentrator now under construction below the stamp mill at Black Hawk. This mill is planned on new ideas, in that it is to handle the slimes which are emptied from the mills above direct into the creek. It will catch and save the gold which the amalgamated plates in the various mills above it fail to stop.

Another stamp mill is to be built in Chase Gulch. It will be a 25 slow drop custom mill with modern improvements throughout.

The average milling charge is \$1.50 per ton.

ORE VALUES.

The ore values for the county have been maintained during the year and may be fairly averaged at \$40 per ton.

There were shipped in 1901 to the smelters at Denver in smelting ore, concentrates, and tailings, 76,120 tons; to Idaho Springs for treatment at the concentration mills, 12,500 tons of mixed ores; shipped to mint at Denver by banks, \$510,000; shipped by mine operators to mint and other buyers, \$500,000.

THE CIRCLE TRAMWAY.

One of the features of the camp is the 2-foot 4-inch railway tram road that reaches nearly all the mines. Much horse labor and hauling is obviated by this mountain climber and the handling of the ore and supplies greatly cheapened.

The W. J. Chamberlain and State ore stamping companies afford ample protection to the miner. They are in close proximity to the mills of Black Hawk.

STEAM POWER.

The motive power of the camps of the county is steam. But five gasoline hoists are installed and electricity is an unknown factor.

There are no chemical plants in operation, and the milling facilities are hampered for want of water. The near future is to provide these necessities.

Tunnels are now being driven from South Clear Creek to reach the various districts of Gilpin, and thus unwater her mines. Great saving will ensue, when this is done, in the expense of hoisting water.

URANIUM ORE.

At the Wood mine, near Nevadaville, the writer saw a shipment of ore being made ready to go to Roxanne, France. The ore was uranium, a product unknown in the famous district until unearthed by the pick in the development of this property. Uranium is a rare metal, resembling iron in luster and color, but in finely comminuted state, occurring as a black powder. It never occurs in native state; is used in hardening steel and coloring china and glass. The shipment being prepared was the third consignment made to France. Price per ton, \$270, net.

GUNNISON COUNTY.

There are recorded in Gunnison County mining claims as follows: Twenty-five thousand lode, 900 placer, 200 tunnel sites, and 175 mill sites. Its mineral area covers several hundred square miles and embraces the ores of gold, silver, copper, lead, zinc, iron, manganese, graphite, and sulphur, while anthracite, bituminous, and coking coal, and marble, slate, granite, lime, and fire clay are deposited in magnitude.

RICHES OF COAL AND IRON.

The coal, iron, and building material resources of the county have been well developed, although each year emphasizes their amplitude and witnesses their wonderful contributions to the State's wealth; but aside from the iron ores, metalliferous mining is in its actual infancy. Isolation from railway outlets for years discouraged this branch of mining, but with the building of railway spurs, convenient and applicable reduction plants, and settlement of outlying districts, persistent operators are now anxiously seeking the precious metals and their associated products.

PITKIN DISTRICT.

The Pitkin district easily leads in metalliferous mining and is the scene of a recently launched enterprise fraught with exceeding consequence to the entire Gunnison country. That well-established mineral belt has enlisted the attention of A. E. Reynolds, one of the State's oldest and most successful operators, who, with a number of associates, has organized the Colorado Smelting and Mining Company.

Five tunnels of from 2,000 to 3,000 feet are being rapidly pushed into a territory of guaranteed worth, as shown by surface and diamond drill explorations. Producing areas are believed to be forthcoming.

Among valuable shippers of the district are the Maid of Athens, Citizen, Silent Friend, Pocahontas, Eureka, North Star, Bullion, and Lily.

WHITEPINE SMELTER.

Just at the year's close the Southwestern smelter at Whitepine was blown in. It has a daily capacity of about 65 tons and is intended to accommodate the Pitkin low grades. A second furnace is assured, the power having been found adequate. This is one of the few lead-reduc-

tion plants of the State. It claims to pay the highest wages among smelters. Its ore purchases will be derived from the following silver and lead mines: Akron, David H., Eureka, Erie, Nest Egg, Bullion, Lily, Silver Cord, Pocahontas, Ground Hog, and Morning Glim.

TIN CUP DISTRICT.

Were it not for the formidable expense of hauling to railways, this district of splendid mineral bodies would have fairly recorded its worth by actual results years since. Therefore, the completed survey for a standard-gauge branch of the Denver and Rio Grande through this northeastern section of the county is proving of tremendous encouragement.

The Forest Hill, Gold Cup, and Enterprise have shipped to some extent during the year, despite the long haul, but the larger share of their output is on the dump awaiting cheaper transportation. A 50-ton mill concentrates the low-grade material of the Forest Hill.

Development work of importance has been done by the Iowa and Kentucky Gulch companies.

Large ore bodies are shown by the Bull Domingo and Star, while the placers of Taylor and Union Arks have been operated after a desultory fashion.

GOTHIC DISTRICT.

Considerable work has occurred in the Gothic district, and limited shipments of ore made.

The Augusta, of Pittsburg Camp, north of Crested Butte, has been well equipped mechanically, and improvements are noted in the Brooklyn.

Irwin has several producing properties.

The Hoffman smelter, at Marble, has handled the small output of Crystal and Marble camps.

The completion of the Crystal River Railroad will stimulate mining in this section.

GOOD HOPE, AT VULCAN.

Some high gold values have been returned from the Good Hope shipments, at Vulcan, and methodical gains have been made at Vulcan, Dubois, Spencer, Iris, and Chance, all included in what is termed the "southern gold belt of Gunnison."

HINSDALE COUNTY.

The construction of power plants and prosecution of development work have been the distinguished features of mining in this county during the past year. However, along Henson Creek, from Lake City to the summit of Engineer Mountain and up the Lake Fork to Cinnamon Pass, the well-known producers have been actively engaged and a number of new properties added to the list of shippers.

The production of several districts was curtailed because of the instability of the price of lead.

The year marked the completion of two of the largest tunnels, run for the purpose of development, and it was a source of extreme gratification that they indisputably proved the continuity of ore bodies with depth.

GOLDEN FLEECE REDIVIVUS.

The exploration tunnel of the famous Golden Fleece, which, prior to 1897, made millionaires of half a score of Colorado men, penetrated a rich vein about the same time as the cross-cut on the Ute, having been sent about 2,500 feet to the latter's 1,600 feet. The intersection in both cases developed the existence of ore of good grade and body.

For some years the Golden Fleece production has been limited to the work of leasers, who have made profitable shipments from several underground passages. In this new work connection remains to be made from the tunnel intersection to the old workings by an upraise of several hundred feet. A large and well-equipped concentrating mill awaits the taking out of Golden Fleece ore.

A well defined true-fissure vein, carrying excellent values, is owned by the Golden Fleece in the Black Crook, and was shown up by a cross-cut.

UTE AND ULAY.

This celebrated group in Galena district, which for twenty-five years has, off and on, yielded astonishing values in high-grade lead, is still in good ore. About two years ago a long working tunnel was started, which, in the spring of 1901, entered an unusually large body of lead ore. Supplemental to the water power a heavy mechanical power plant has been completed, to be followed by an approved compressor of 20 drills. The Ute's daily shipments average two cars of high-grade concentrates.

THE HANNA ENTERPRISE.

For several years the Hanna Mining and Milling Company, operating the Moro and Ajax group, has been busily engaged in development, with the result that in three levels over 3,000 feet of ore are uncovered. A tramway will now deliver to the mill which has just been purchased the adequate ore supply.

HENSON CREEK LEAD MINES POWER.

An interesting feature of this district is the completion by the Henson Creek Lead Mines Company of a singularly attractive electric-power plant which transmits current in goodly quantity a distance of 3 miles to the company's properties on Sheep Mountain, where the Bonanza tunnel is utilized for development. Good milling ore is exposed for fair distance, and a milling plant is of immediate necessity and will be supplied.

THE LILLIE GROUP.

The Red Rover Company, which is confining its attentions to the Lillie group, has completed a long cross-cut tunnel, disclosing an admirable ore body, from which an upraise is being diligently carried to the upper bodies. Additional to the power plant of this company, it has arranged for a 100-ton concentrator.

HIDDEN TREASURE INOPERATIVE.

The Hidden Treasure has discontinued its very large output of high-grade lead, claiming that its failure to contract with the smelting consolidation has eliminated its market. It is a well-known extension of

the Ute vein, and while not outputting at present the stripping and exposing of its ore bodies continues, and the property is maintained in good physical condition for resumption.

The California, located on an extension of the Ulay vein, has produced somewhat during the year, its output being subordinated to shaft workings. A 500-foot cross-cut tunnel is projected to attain greater depth.

GOOD COPPER VALUES.

In Burrows Ark a group of copper workings showing 17 per cent copper in lots is to be developed by a long tunnel driven from near the level of the Lake Fork River.

BON-HOMME GOLD AT DEPTH.

In the same locality the Scantic Gold Mining Company has half completed a 1,600-foot bore to cut the Bon-Homme vein. This property counts upon gaining at depth even superior gold values to those long found in the upper workings.

LARGE POWER DAM.

One of the State's largest dams is under construction by the Tobasco Company, which is intended not only to develop power sufficient to work its own property on Cinnamon Mountain, but will lease power to neighboring companies.

CARSON CAMP.

The Bachelor Company has secured practically all the claims of Carson Camp and is sinking its three-compartment shaft to 500 feet, and announces its intention of driving its exploiting tunnel 1,000 feet.

RUBY SILVER.

At the close of the year the Monte Queen made a notable find of ruby silver.

The Contention and Sherman, in Lake district, claim good ore, the latter showing 773 ounces silver and 1½ ounces gold.

LAKE COUNTY.

The output from mining operations in progress in the Leadville locality comprises sulphides, oxidized iron ores, zinciferous ores, and those carrying a commercial portion of bismuth.

The sulphides at present have a considerably limited market, while oxidized iron ores find a ready market. It is believed that this production will not suffer any limitation, at least through any outside causes.

The Leadville Basin is now the greatest producing locality of oxidized iron ores, and the New Home Mining Company is believed to be the largest individual producer. This property is worked through the three shafts of the company—the Penrose, Starr, and Bon Air—all thoroughly equipped with hoisting and pumping machinery fully capable of performing all work required. The most active operations are conducted through the Penrose shaft. The quantity of ore in sight within the several excavations surpasses any heretofore revealed.

The Starr shaft is operated at the 500-foot level.

The Bon Air shaft has a good body of ore developed, from which there is a steady production.

The development from operations in 1901 give evidence of the continuation to the west of the great Penrose body, and forms one of the important achievements of the year. At no point within the workings of this property has the parting quartzite been reached. It is estimated that there is enough ore traced and blocked out to keep up shipments steadily for 1902.

CLOUD CITY MINING COMPANY.

The Cloud City Mining Company, which commenced development in 1900, was in December, 1901, successful in opening a body of iron ore very similar to that of the New Home property.

NEW MONARCH GROUP.

The New Monarch group, embracing the Lida, New Monarch, Little Winnie, and others within a large acreage, exhibits considerable development, outputting a large tonnage of good value.

The Lida is 420 feet deep, with large bodies of siliceous ore opened and attempt made to reach the sulphide body.

The Little Winnie, operated through a shaft, gives evidence of a large ore development, shipping about 100 tons of sulphides per day.

During 1901 development of this vein was carried for some 700 feet on its strike. The upper portion is an oxidized ore, changing with depth to sulphide, resting on the quartzite. Rich streaks occur carrying gold, silver, copper, and lead, with an average value of \$30 per ton.

The New Monarch shaft, about 1,000 feet northeast from the Little Winnie, has in its development evidently proven up the continuance of this ore body. Originally the diamond drill disclosed sulphides.

In 1901 the shaft was sunk considerably below the 700-foot level and disclosed some 200 feet of sulphide ore, but broken in places by intrusive sheets of porphyry. In some places the sulphide was 15 to 20 feet thick, all good ore.

Based upon the underground development of large ore bodies, both oxide and sulphide, surface betterments of the property have in the past few months received almost exclusive attention.

Through some differences between the American Smelting and Refining Company and the New Monarch as regards treatment charges and other matters relative to marketing the ore, the New Monarch Company some six months ago decided to suspend ore shipments until other arrangements could be perfected.

DEVELOPMENT AND DRAINAGE COMPANY.

The Leadville Development and Drainage Company has, within the year 1901, undertaken an important prospecting enterprise within an undeveloped area of their own property, northwest from Leadville. This work is carried forward by alternate diamond drill and shaft sinking.

The theory that mineral will be found in the new territory has the faith of many mining men of Leadville. It is expected that this work will prove profitable if ore chutes really extended far westward.

AS TO THE SULPHIDES.

It is generally stated by those most competent to judge that in the large bodies of sulphides so far explored in the Leadville locality these have always been found in connection with the mineral "marmatite," or ferriferous sphalerite, and it is in all gradations from a pure zinc sulphide to a pure iron sulphide, and, further, from a geological standpoint (not the mining), they estimate that there are approximately 3,500,000 tons of zinciferous ores in sight. It is found that the Leadville ore chutes are very regular and hold up nicely.

GREENBACK MINE.

The Greenback Mine is operated through a shaft, present depth 1,240 feet, and will be sunk not less than 150 feet deeper. Work in progress is largely development. During the year 1901 there was opened 200 feet of iron sulphides, carrying 15 to 20 ounces of silver, 0.05 to 0.06 ounce gold, and occasionally copper to 3 per cent.

Out of a lot of 20,000 tons, 250 tons yielded copper to a small money payment. The Greenback is now shipping from 200 to 300 tons of ore per day. It has been decided to install a new hoisting plant, with an ore capacity of 750 tons per day. This will be completed in April, 1902.

OLD PROPERTIES LEASED.

The A. M. W. Co., a leasing company, is working the following-named mines: Wolftone, output 60,800 tons; Adams, output 36,700 tons, and Maid of Erin, output 4,500 tons.

The ore is iron, lead, and zinc sulphides, and in addition the Wolftone and Maid of Erin produced 995 tons of carbonates.

The Castle View Mining Company made an output of 2,140 tons of manganiferous iron ore.

The Mab Leasing Company shipped 1,000 tons of manganiferous iron; also 750 tons of sulphides.

Midas Mining Company (leasing company), from the O. Z. and Dillon claims, shipped 68,000 tons of argentiferous iron ore.

LEASING AND SUBLEASING.

It is estimated that 90 per cent of all work in Leadville mines is by leasing and subleasing, at royalties that range from 5 to 40 per cent, based upon changes in ground and returns received from smelting works. The probable average of royalty paid is 10 to 15 per cent. Large leasing companies also pay taxes on property, output tax, and, in many cases, insurance; also assume cost of mining and responsibilities, and install on their leased premises hoisting and pumping plants as their operations may require.

SMELTING PLANTS.

The Arkansas Valley smelting plant, owned by the American Smelting and Refining Company, is in active operation.

It is expected that other plants owned by the American Smelting and Refining Company will at an early day be placed in commission.

MILLS.

Moyer mill, concentrating 100 tons of ore per day; A. M. W., 100 tons; California Gulch, 50 tons; A. Y. and Minnie, 50 tons.

The crude ore is crushed to pass a 30 to 40 mesh screen, then treated on table machines, making two products—the first to as near 50 per cent zinc as possible; the second is an iron and lead, containing gold and silver.

Ores containing zinc in the main part are held in reserve for the now well-assured market demand.

A new plant for treatment of zinciferous ores is in construction by the American Smelting and Refining Company at Pueblo, and other parties are erecting a plant in Leadville for treatment of zinc-bearing ores.

ZINC CONCENTRATES.

The zinc concentrates have a market at the La Salle Smelting Works, but the larger portion is loaded at the works in bulk in railway cars, thence shipped to Galveston or New Orleans for final loading and delivery to zinc-smelting works of Antwerp.

These shipments are bought and paid for by local agent in Leadville at a flat price on a basis of 45 per cent zinc, penalties and premiums considered. The miner receives about \$5 per ton; cost of mining, hoisting, and placing in loading bins is about \$1 per ton.

BISMUTH ORES.

Ores carrying bismuth carbonates are produced by the Ballard, Bruce, and Big Six mines. Shipments have been made to St. Louis, also Liverpool, but owing to the limited demand and care in maintaining the price neither the producers nor buyers are willing to make known the status of the market. It is estimated that 1,000 tons of bismuth carbonates were shipped during 1901.

GOOD RAILWAY SERVICE.

Very satisfactory railway service is given by the South Park, Rio Grande, and Midland Railway Companies. Spurs are laid from their lines to most of the larger mines, where the ore is loaded direct into freight cars, thence proceeding to destination. Wagon haul of ore is now probably less than 20 per cent of the output of the Leadville locality.

Steam power is most generally used at the mines and mills; electricity for lighting is employed whenever practicable.

PLACER AREAS.

Near Leadville and extending through the county of Lake there are large placer areas. These have received very little attention for several years, but now the placer-mining industry has a growing recognition.

MINERAL COUNTY.

The year 1901 was noteworthy in Creede's mining history for the great amount of development work, marking the policy of its most

notable producers, whereby these properties closed the year with well-proven and substantially valuable reserves, which thoroughly justified the installation of costly plants of modern machinery and satisfactorily demonstrated the permanency of ore bodies which have yielded steadily for a long period.

Despite the low price of silver and unstable lead market, the camp marketed a tonnage approximating 80,000, a gain of 2,000 tons over the preceding year, and its output would necessarily have been largely increased had not a serious shortage of cars for transporting the ores occurred at various times during the twelvemonth.

Contentions with the smelters over treatment rates restrained shipments, and litigations, in which a number of former heavily producing properties were involved, served to militate against that uninterrupted prosperity for Creede which appeared to be guaranteed at the year's opening.

The Amethyst, Chance, Del Monte, New York, and Park Regent are among the valuable holdings tied up by legal controversies.

Prospecting of the unusual-sized and well-known veins that have made Creede's history progressed vigorously, and the camp stands ready to-day, under normal conditions, to divide honors with the best Colorado mining sections boasting kindred ores.

DEEP MINING.

Creede's big shafts have attained a depth of 1,500 to 1,700 feet, and the present sinking of the Commodore shaft will cut and open Bachelor Mountain at a depth of 2,000 feet. The ores have indisputably gained with depth, in width, and values have been maintained in the main.

The Humphreys Tunnel Company opened up the vein conclusively and extended the famous Nelson tunnel beyond existing producers and several hundred feet below their workings.

The Bachelor pushed development over 200 feet underneath the Nelson level.

With deeper mining, values in gold have advanced, and this camp, which in its early history scarcely recorded a gold production, bids fair to see the million mark in the yellow metal as depth is gained.

THE YEAR'S BEST SHIPPERS.

The Commodore and Bachelor have worked uninterruptedly, and the Corsair, the most important member of the Sunnyside district, was a fairly consistent shipper.

The Ridge yielded steadily until the last quarter of the year, when a suspension of work occurred owing to disagreements among the lessees as to plans of exploiting newly found ore bodies.

The big shaft from No. 5 level of the Commodore (14 by 14 feet) engages the attention of 75 men. It will be sent 700 feet with an adequate pumping plant. The Commodore's aerial tramway can care for 1,000 tons daily. Its water, electric, and steam power can develop 5,000 horsepower. In every respect the Commodore ranks with the best-equipped mines in the country.

THE BACHELOR.

The Bachelor mine is being operated under the leasing system, and its output has come by way of the Nelson tunnel, at the mouth of which are established the company's ore bins, grizzlies, and sorting tables.

UNITED MINES COMPANY.

Five years ago the United States Mines property, comprising the New Discovery, Happy Thought, Golden Eagle, and Argenta claims, was leased to the Big Kanawha Company for a term of ten years. This corporation, comprising largely stockholders of the United States Mines Company, has expended during the year over \$100,000 in extending levels, sinking their shaft over 500 feet to make tunnel connections and enlarging it to a three-compartment shaft. Six thousand feet of drifts are divided among 13 levels in the mine.

HUMPHREY CONCENTRATING MILL.

The year's most notable addition to Creede and one of the State's really important acquisitions, from a mining standpoint, was the Humphrey concentrating mill, which contains all the well-founded systems of ore concentration and makes distinct advances in several departments. The mill is admirably located on the mountain side, is gigantic in appearance and in reality, and in successful operation can not fail to enlist the interest of mill men of all camps, and will doubtless stand long as a model for future plants.

It is most substantially constructed, the foundations being cut out of the side hill, and the retention walls are of sound masonry, averaging 4 feet to the extent of 1,000 cubic yards, while the rock and cement bases for all grinding appliances are of surpassing strength.

The mill will handle the ores of the Kanawha Company, and was designed and equipped with reference to the most advanced methods of concentration, reducing from 4 to 10 tons of ore (according to grade) into one ton of concentrates. Its present capacity is 250 tons daily, but the surplus power of all transmitting machinery will admit of doubling the capacity when found desirable.

WATER POWER.

Three thousand gallons of water per minute from the Nelson tunnel, if required, will furnish power. The water is first conveyed from a point 600 feet in the tunnel through a 3-foot steel pipe out past the tunnel's mouth into a flume, which is carried 2,000 feet alongside the trackway to the penstock. Here it descends through the power pipe, 24 inches in diameter and 400 feet long, with a 200-foot head.

DIMENSIONS OF MILL.

The mill building extends 400 feet along the slope of the hill, having a base of 300 feet, and its height exceeds 200 feet from wheel pit to the top of the crusher floor.

The entire plant was designed by Mr. George Davis, the general manager for Mr. Humphrey and his associates, and its construction was confided to Mr. Raymond Whinnerah. Its cost exceeded \$100,000.

DETAILED DESCRIPTION.

The ore is trammed from the mines through the Nelson Tunnel and over a surface tram to the mill. Stock bins of 600 tons capacity receive it. Thence to scales, accurately weighed, and over a grizzly, the oversized being subjected to a 10 by 20 inch Blake crusher.

The undersized and crusher product is automatically fed through roughing screens 3 by 3 feet in size, then through an automatic sampler to two pairs of 14 by 36 Jackson rolls. The material is then elevated and passed through two lines of revolving sizing screens, each consisting of four screens 3 feet in diameter by 6 feet in length.

These screenings are handled by 12 four-compartment Hartz jigs, the tailings and middlings passing through 3 sets of 14 by 30 rolls; then to 9 Wilfley tables for fine separation. Two Bartlett tables, placed above the Wilfleys, reduce the amount of lead in the slimes and handle that part of the ore passing through 16 mesh in the line of sizing screens. The zinc is separated from the gangue by the Wilfley tables. Eight large settling tanks care for the excess water.

The oversize from the revolving screens is elevated by Frenier sand pumps to the rolls for regrinding.

The concentrates from the jigs fall into hoppers and are automatically delivered into chutes or spouts leading to the ore or concentrate bins at the railroad track, which consist of six steel-lined bins and are directly located under the Wilfley table floor.

The tailings from the tables are handled by laundries driven by Bolthoff patent launder motion.

All bins, spouts, launders, chutes, and hoppers are lined with one-fourth inch flange steel.

The screen jackets are false lined and all other parts of the mill subject to wear are similarly protected, about 20,000 pounds of one-fourth inch steel lining being required.

ELECTRICALLY LIGHTED.

Electricity from a 165-light dynamo completely lights the mill, and appliances for fighting possible fire are installed on every floor.

Two Pelton water wheels (4 and 6 feet, respectively) furnish the mill power. The 4-foot wheel has a Replogle governor and drives the tables and dynamo, while the 6-foot wheel runs the rolls and crusher.

The tables are driven with American expansion pulleys. The power is distributed to the line shafts with continuous rope drivers.

HEATING.

The mill is heated throughout by the Sturtevant system, consisting of steam heaters, radiators, and one control galvanized air duct with fan for distribution of heated air through the building.

The steam for the heater is supplied by a large boiler, and the mill is thoroughly piped to supply water for fire protection as well as concentration.

OTHER MILLS.

Other successful Creede milling plants are the well-known Ridge and the Solomon and the Happy Thought, each of 50 tons daily capacity and admirably handling the zinc-lead ores, their concentrates commanding the best prices paid in the State.

REFINED SULPHUR.

A New York corporation, known as the American Sulphur Mining Company, in June last purchased a large acreage of sulphur-producing territory on Trout Creek, 25 miles southwest of Creede, and at the close of the year, having completed a refinery, began filling a contract of magnitude with Eastern parties, the sulphur bringing \$20 per ton, delivered in New York.

OURAY COUNTY.

The output of Ouray County for the year 1901 failed to exceed that of the year previous, and yet it was the most prosperous year in many senses in its history. While the Camp Bird, despite a large amount of work along the line of development, and the expenditure of some \$250,000 in additions and machinery, and the Revenue, of silver-producing fame, probably held their own in the matter of production, the Bachelor and Kehdive noted materially reduced figures.

The exhaustion of the extensive dump milled by the Bachelor in 1900, additional to its regular mine product, explains the figures of that property.

HOME PYRITIC SMELTER SHUT DOWN.

The failure of the Home Pyritic Company to operate its plant but briefly acted as a blight upon the prospects of a number of low-grade holdings, which had steadily advanced their development work in the belief that their products, which could not meet existing freight rates and treatment charges elsewhere, were now guaranteed a profitable market right at home.

This pyritic plant and its treatment process are generally believed to be fully equal to the characteristic ore bodies it was designed to serve, and its closing is attributed to dissensions among the owners touching relative interests and policies of operation.

Believing that enduring harmony in the management will be restored and the plant again be active by the spring of 1902, many of its short-time customers and others are going ahead to the end that a substantial tonnage may greet its resumption.

PRODUCTION PRELIMINARIES.

The year was exceptional in new ground opened up by the regular producers and a reawakening of properties which have remained idle for some years, notably the El Mahdi, at Ash, which a decade since was justly designated the Silver Queen of this picturesque region. Heavy machinery of modern pattern has been installed, and a cross cut from the bottom of a 230-foot shaft will cut the old El Mahdi vein.

RED MOUNTAIN'S AWAKENING.

Other properties burnished up for the coming year activities are the once lusty representatives of the Red Mountain district—the Guston, Yankee Girl, and Hudson.

CYANIDING.

The establishment of cyanide plants by all the important mining companies of Sneffles and other districts is assured, the grand results

of the Camp Bird cyanide mill in saving remarkably close the tailings which had formerly run to waste having fully demonstrated the adaptability of cyanide to the district formations. Several large operators are already arranging the details preliminary to such mill construction.

TONNAGE FOR 1901.

Principally in concentrates the shipments from Ouray station during the year totaled 1,554 cars, or 15,560 tons, and from Red Mountain, via Silverton, to the smelter at Durango, 347 cars, carrying 3,470 tons of ore.

The Camp Bird and American Gold Mining Company's bullion was consigned to the Denver mint.

SNEFFLES DISTRICT.

The Sneffles district is the busy center of Ouray County mining and the home of its famous producers. The Revenue, at Mount Sneffles, possesses the deepest workings in Colorado—3,400 feet. To properly operate its lowest levels additional power is found necessary and a fourth power plant is under construction at Ouray. The four will readily provide electric energy to the remotest points of the subterranean chambers and materially enhance the values marketed.

The Revenue-Virginus constantly employs from 500 to 700 men, who constitute the bone and sinew of the thriving town of Sneffles.

CAMP BIRD.

The Camp Bird, with its well-exploited gold-silver ore bodies, in quantity, creditably reported as sufficient to keep its average force of 300 men busy for half a century, is the pride of Ouray and a monument to energetic and comprehensive mining, which not alone meets every mechanical requirement and scientifically pushes levels, stopes, and winzes, but from the start made the physical comfort and moral environment of its men a paramount concern.

The spacious boarding house for the men contains extensive and scrupulously clean lavatories, a well-selected library, and an inviting reading room, and is withal on a par with the best hostelries of the region.

STRENGTHENING PLANT.

Camp Bird development of the year was on a big scale, and its milling capacity was necessarily enlarged. A Corliss engine of 350 horsepower, supplied by three new tubular boilers of 150 horsepower each, has recently been placed, besides two 100 horsepower compressors. The cyanide mill cleanly treats the tailings of 250 tons, crushed daily by 80 stamps. The saving is claimed to lack nothing.

BACHELOR AND AMERICAN-NETTIE.

Dexter Creek's best representative, the old and steady Bachelor, employs about 300 men in mine and mill, and the American-Nettie, operated by the American Gold Mining Company, an equal number. Both properties are in the best physical condition.

The Camp Bird Extension, Slide, Newsboy, Portland, and Modesha, among others, have amply prepared for aggressive operations and should substantially produce during the coming year.

PARK COUNTY.

The review of Park County for the past year shows marked improvement and development of the mines and prospects.

Tunnels are being driven to cut the veins at greater depths and prove the existence of ore bodies with deeper exploration.

Two diamond drills are working on the east side of the Mosquito Range and have reached a depth of more than 1,000 feet. The companies operating the drills are seeking to prove the continuation of the Leadville formations. Their persistent work and desire to acquire new territory indicate success, though the results are closely guarded by those interested.

New companies with ample capital have been investing in the lode and placer mines during the year.

The ore is shipped over the Colorado and Southern Railway to the smelters at Denver. There are no public stamp mills in the county, which lack operates against the output. Tunneling is the prevailing method of mining in the district, thus draining the properties of water with but little expense.

ALMA DISTRICT.

In the vicinity of Alma the principal producers are located. The London mine is shipping a sulphide ore, carrying 2 to 5 ounces gold, 3 to 10 ounces silver, and 15 per cent lead.

The tunnel workings are in about 2,800 feet, with 300 feet of stoping ground.

The Orphan Boy is being systematically developed and shows a heavy iron sulphide ore, carrying gold and silver, averaging about \$40 a ton.

The workings consist of a main tunnel, in 1,400 feet; a cross-cut of 1,000 feet, and drifts, about 6,000 feet.

The Ling mine is situated on North Star Mountain. During the season this property shipped considerable ore averaging \$100 per ton in gold, with but little silver.

At present the company is doing development work. Machine drills are driving a tunnel 1,000 feet to cut the vein at 700 feet from the surface.

Active development is being done on the Kentucky Belle, Hock-Hocking, Oliver Twist, James G. Blaine, Mascotte, and Viking, but the shipments of ore were small.

HORSESHOE DISTRICT.

This camp has shipped some ore from the Chance, Hill Top, and Peerless Maud, but the main work was development.

Puma City, Freshwater, and Weston Pass districts have all been actively prospected and some good ore discovered.

FAIRPLAY PLACER DISTRICT.

The placer grounds about Fairplay and Alma have for years yielded good wages to the man with the pan, and also paid on the investment of capital.

The Fairplay Placer extends about $2\frac{1}{2}$ miles along the Platte River. Some development work was done by a new company during the year, which placed the property in good shape for the coming season.

Bed rock has never been worked, owing to inadequate machinery, but the surface gravel has proved beyond a doubt the values below.

Chinamen have for years taken out thousands of dollars on this and adjoining properties, though working with their crude and primitive methods.

BEAVER CREEK AND SNOWSTORM PLACERS.

The Beaver Creek placers have been idle for about five years, owing to litigation, which has now been settled. A consolidation of the Beaver Creek and Snowstorm placers has been accomplished.

The merging of these two properties will be beneficial in many ways to both. The Mosquito and Beaver Creek ditches and other water rights will have a carrying capacity of over 4,000 inches. The sluicing can be done with the cheapest hydraulic methods, owing to sufficient grade to allow the use of pipe line, giants, and sluice boxes. The gravel beds average about 30 feet in thickness. The Snowstorm deposit is said by old placer miners to be among the richest in the district. If such is the case, economical and intelligent mining will be amply rewarded.

ALMA PLACER.

This property has been worked almost continuously since 1870. It is situated on the Platte River and consists of about 3,000 acres, only 30 of which have been systematically operated.

A ditch about 2 miles long, taken out of the Platte, furnished 2,500 miner's inches, and is adequate for the present workings.

Twelve hundred cubic yards of gravel have been handled in a day, and this will be more than doubled with contemplated improvements.

The gravel beds are about 50 feet in thickness, carrying coarse gold. Nuggets ranging from \$5 to \$20 have been taken out; the average of the present workings is 40 cents per cubic yard.

Simple hydraulic methods are employed in working the placer ground.

Tarryall and Peabody placers were worked, principally by Chinamen, during the year on a small scale.

PITKIN COUNTY.

The mineral deposits of Pitkin County have evidently attained the most extended development and largest outputs of ore from the locations in the Roaring Fork mining district and more central, within and near Aspen, the county seat.

These mineral bodies occur, as locally expressed, between the "blue" lime and the underlying "brown" lime.

The ore mined is practically in two classes, locally called "Lime base" and "Spar, or Baryta base."

The mineral values are of a sulphide of silver, finely disseminated throughout the gangue, with some native silver; also galena and zinc in small proportion; the main values are in silver.

Mineral formations in most all other portions or mining districts of Pitkin County, and principally in the southern and western, are largely granite, and the ores there found are in fissure veins, carrying sulphides of iron, copper, lead, and zinc, and these enriched with some gold and silver in varying proportions.

WELL-KNOWN PROPERTIES.

Some few of the best-known mines of Aspen are the Mollie Gibson, A. J., Smuggler, Della S., Durant, Compromise, Late Acquisition, Enterprise, and Mineral Farm. The next in prominence are the Mayflower, Aspen, Conemora, Bushwhacker, Mineral, Alter Argent, Bay State, and Keystone.

The several mining companies most active and making the largest outputs are Smuggler, A. J., Durant, Compromise, Late Acquisition, and Enterprise, all of which are locally known as the Hymen group.

The Mineral Farm Consolidated and the Buchanan are of the Hagerman group.

TUNNEL OUTLETS.

The several tunnels through which the most extensive mining operations are conducted are as follows: The Cowenhoven, $2\frac{1}{2}$ miles long; Smuggler and A. J., 3,000 feet; Durant, 8,500 feet; Compromise, 7,000 feet; Newman, 5,000 feet; Robinson, 3,000 feet.

These tunnels are intersected by or have various shafts, upraises, stopes, and inclines. Nearly all the excavations are timbered, and where necessary in the square set-system large stopes in 12-inch sets and afterwards in heavy ground are filled. Small stopes in good ground use 10-inch sets. Most of the mine timbers are placed in square sets, cut to measure by mine timber-framing machines, insuring perfect-fitting joints and tenons.

DRILLS AND HOISTS.

Machine drills are most generally in use and are driven by compressed air or electricity. The number of 2-inch drills is increasing, more especially in streaks of 4 to 5 feet in width.

Underground hoists are operated by compressed air or electricity.

In ventilation there are from 25 to 30 electric blower fans of 6 inches to 10 inches outlet.

Miners' wages range from \$2.50 to \$3 per day of eight hours. Shaft men receive from 25 cents to 50 cents extra.

WATER PLANTS.

There are several mines pumping 500 to 1,000 gallons of water per minute.

Direct-acting steam pumps are used. The largest has water ends of 16 inches; others, 10 inches. The greatest depth attained is 1,300 feet.

Most of the mines employ electric power, transmitted from a central electric power and lighting plant, which plant is driven by water power. The tunnels are electrically lighted. Ore cars are drawn by horses.

MOLLIE GIBSON AND A. J.

The Mollie Gibson and A. J. mines are on opposite sides of the valley of the Roaring Fork, which stream flows through the town of Aspen. These are connected by an underground tunnel starting from the A. J. property by an incline to a depth of 1,100 feet, thence crossing under Aspen and bed of Roaring Fork stream, a distance of nearly 1 mile, in making connection with the Mollie Gibson shaft. This tunnel, or level, is 3 feet 6 inches in width and 6 feet 3 inches high, and has a track of 12-pound rails laid at 18-inch gauge. Here is an interesting feature—an electric trolley locomotive of only 6,000 pounds weight drawing a train of 12 to 14 ore cars, each about 750 pounds weight and carrying 1,600 to 1,700 pounds of ore each.

COWENHOVEN AND NEWMAN TUNNELS.

The Cowenhoven tunnel intersects the Della S. and many other mines of Smuggler Mountain.

The Newman tunnel, 1 mile from Aspen, running for lime contact, is a comparatively new enterprise, now well advanced, with reported excellent results. Like the great Cowenhoven tunnel, it controls a large acreage and may eventually prove an outlet for the mines of Tourtalette Park, which at one time made large outputs. It is estimated that the ore as now mined in Tourtalette Park averages 15 ounces silver and 10 per cent lead per ton. This average is somewhat higher than the estimated average of all ore mined in the immediate Aspen locality.

MILLS.

The Smuggler owns and operates two ore-concentrating plants. Their combined capacity is 300 crude tons per day. This company also has a sampling plant for treatment and shipment of their own ores and concentrates.

The ore-concentrating mills are in construction specially arranged—one for coarse crushing and concentration, the “lead mill,” and the other fine crushing and concentration, the “zinc mill.” They are so called because the lead is so finely disseminated in the zinc that a final fine crushing is necessary to thorough separation.

Average value of crude ore treated was $10\frac{1}{2}$ ounces silver, $8\frac{1}{2}$ per cent lead, and $16\frac{1}{2}$ per cent zinc per ton.

Average value of mineral concentrates saved was 48.4 ounces silver, 59.3 per cent lead, and 9.3 per cent zinc.

Settlings saved in reservoir: 9.9 ounces silver, 3 per cent lead, and $31\frac{1}{2}$ per cent zinc.

Treatment averaged a reduction of 9.2 tons of ore to 1 ton of mineral concentrates.

Both of the above-named mills, being of early construction, have gradually improved as repairs were needed, and plans are now perfected for remodeling in 1902 at an expenditure of not less than \$30,000.

HUNTER CREEK MILL.

Hunter Creek mill is located at mouth of the Cowenhoven tunnel, base of Smuggler Mountain, for the purpose of concentration treatment of ores mined and output through the said tunnel, which has

penetrated Smuggler Mountain a distance of $2\frac{1}{2}$ miles, close to what is known as the "contact" between the Middle (shale) and Lower Carboniferous (lime) rock.

In the bulk of ore as at present delivered from the Della S. mine direct to the Hunter mill the mineral is disseminated so finely that it can seldom be directly seen in the mine, but by rubbing the ore with the pick the amount of glossy lead or silver stain determines approximately the value for concentration, which at present price of silver and lead must equal about 9 ounces silver and 4 per cent lead.

The works were placed in commission late in October, since when they have been in active operation, yielding very satisfactory results from a very low-grade silver and lead ore, and they are evidently a close approach to solving the problem of treatment of low-grade refractory ores, the output of which in the Aspen district is large.

The system of ore concentration was perfected through a series of determinative tests; likewise all machinery and mechanical appliances employed, and these of the latest proven types and manufacture, were selected and assembled in place upon (as near as may be) intelligently predetermined methods.

DUPLICATE INSTALLATION.

The installation is in duplicate, so that ore treatment may be in check and details adapted to the general varying conditions of ore, or ore from two different mines be under treatment at one time.

INITIAL RESULTS.

Inasmuch as the Hunter mill has been in operation only sixty days, its full efficiency can not be accepted so determinatively as may be after a longer campaign. The operations for December, 1901, were in the aggregate as follows: Total silver saved in concentrates, 20,117 ounces; lead, 150,851 pounds; per cent silver saved, 81.1; lead, 84.3; net saving, 83.7 per cent. Average assay value of crude ore, 8.4 ounces silver; 3.18 per cent lead.

In this connection a point of interest is shown in results of January, 1902. Briefly, the mill averaged 104 tons crude ore per diem, the average saving of silver and lead being 87.5 per cent.

SYSTEM OF INSTALLATION.

The system of installation in the Hunter Creek mill furnished by the engineer, to whom much credit is due in working out and perfecting this milling plant, Mr. Charles Anderson, manager, also manager of the Della S. mine, and from which mine all ore under treatment at present time is supplied.

The machinery consists of one 6 by 20 inch crusher, two pairs of 30 by 14 inch rolls, two 6-foot Huntington mills, twelve Wilfley concentrators, four belt machines 6 feet wide, and automatic dryers with automatic sampling apparatus through which the whole quantity of ore from the rolls, screened to $\frac{3}{16}$ -inch mesh, passes into storage bins, thence to the Huntington mills, and is pulverized with pressure of water through a No. 35 mesh screen, thence through a V trough, one for each mill, with grade to slowly carry the heavier granulations forward. The bottom of these troughs are fitted with adjustable classifiers in

such a way that the horizontal surface current of the pulp is not disturbed. The thus partly classified pulp flows to two series (six in each series) of table machines. The "middlings" from each series of tables are carried by a shaking launder to an elevator, thence flow on to another table.

CARE OF THE SLIMES.

The slimes flow from the hydraulic classifiers into tanks, and after settling are fed automatically for each series of tables. The vanners make high-grade slime concentrates and worthless tailings.

The mineral concentrates from all machines are carried by shaking launders to small tanks with screw conveyors in the bottom, feeding the settled concentrates to automatic steam driers, which discharge the concentrates into storage bins ready for shipment.

When the ore is broken it is loaded into the mine ore cars, five forming a train, thence by horse drawn out through the Cowenhoven tunnel, a distance of about $2\frac{1}{2}$ miles, and unloaded upon a grizzly set in top floor of the Hunter mill, thence through machinery and appliances, without intervention of hand labor, until it is by one man loaded into railway cars for shipment, at a whole cost of less than 50 cents per ton.

The Hunter mill is lighted and driven by electric power transmitted from the Roaring Fork Electric Lighting and Power Company, which employs water power.

The mill is heated by steam; mineral concentrates also dried by steam.

The mining industry of Aspen is well served by the Denver and Rio Grande, also the Midland Railway system, spurs from their main tracks being laid to all the larger mines, also to the concentrating and sampling works, thus affording excellent facilities of transportation of ores and concentrates without intervening cost of wagon haul.

SAN JUAN COUNTY.

San Juan and silver were, for years, in the vocabulary of the mining world, convertible terms, but the year 1901 witnessed in San Juan County a greater valuation in gold extracted from the ores than of any other metal, and the change of district designation from "Silvery San Juan" to "Golden San Juan" is not only warranted by the facts, but promises to become more emphasized with mining depth obtained.

The year was notable for the constant inquiry of capital eager to find application to the great zone of gold-lead and silver-lead ores, seamed with especially wide and deep true-fissure veins. Properties of long-established value were purchased outright, some \$5,000,000 directly changing hands in these purchases, while subordinate holdings were secured by Eastern investors in nearly every camp of the county.

SILVER LAKES' SALE.

Among the larger sales was that of the Silver Lakes group, combining 175 mines, mill sites, and placer claims, the American Smelting and Refining Company being the purchaser for two and one-third millions of dollars.

This property, under the careful supervision of its original owners, E. G. Stoiber and wife, exemplified conspicuously the value of scientific exploitation and the application of advanced methods and appli-

ances. In every department, from a modest beginning, it was developed thoroughly and logically, until its gigantic trams, comprehensive milling facilities, consistent underground workings, and model boarding houses for its employees first caused contemporary companies to wonder, then delight in the proven returns of its enterprise, and, finally, to emulate its energetic management.

This great property covers a surface area exceeding 1,200 acres, and is fully equipped with electric plants of the first type. It employs over 500 men and its yearly output is about 90,000 tons, its crude ores and concentrates going to the smelter at Durango.

Its tonnage promises to be largely increased by the Unity tunnel, which will afford convenient outlet to the new ore reserves opened up in the very lowest levels.

The mill at the lower terminal of the 12,000-foot tramway is being further reenforced and modernized by the new owners.

Both electric and air drills are employed in the mines, power being obtained from the power house on the Animas River, 6 miles distant.

The average value of Silver Lakes' concentrates, carrying lead, copper, gold, and silver, equals that of the best neighboring properties.

OTHER SALES.

Other well-established producers changing hands and their purchase prices were the North Star group, on Solomon Mountain, the highest mining location in the State, 13,300 feet, for \$85,000; the North Star mine, on Sultan Mountain, \$300,000; Champion No. 2 group, on Sultan Mountain, \$60,000; Great Mogul and Ross Basin group, above Gladstone, \$75,000; Wabuse group, \$25,000.

TONNAGE OF THE MINES.

The year's tonnage of the properties, with Silverton as the mining capital, closely approximates 40,000, all but 5,000 tons being in the form of concentrates. The crude ore mined reached 242,850 tons.

MILLING FACILITIES.

The county is well supplied with mills, and four railroads from its different sections give ready conveyance to the ores. The mills in active operation and their daily capacity are:

	Tons.
Silver Lake mill No. 1	250
Silver Lake mill No. 2	200
Gold King	250
Iowa Tiger	150
Sunnyside	150
Empire Hercules	100
Yukon	75
Great Mogul	75
Terry	50
Sunnyside Extension	50
Howardsville	40
San Juan Chief	40
Silver Queen	40

PYRITIC SMELTER.

The Kendrick-Gelder smelter, which was operated a portion of the year, proved of advantage in offering a market to such low grade as had formerly been practically negatived by freight and smelting

charges. It largely expedited the development of such bodies of ore, and converted into copper matte 5,500,000 pounds from the upper levels of the Henrietta.

When necessary changes are completed to this pyritic plant it will find constant employment and probably solve a pressing need of the district.

TUNGSTEN ORES.

As an interesting element in San Juan County ores may be mentioned tungsten, the year's production reaching 12,500 pounds, evidencing from 66 to 71 per cent tungstic acid.

VERY WIDE VEINS.

The exceptionally wide veins common to San Juan is emphasized in that of the Osceola property of the Green Mountain Mining Company. The exposed vein is 75 feet wide, with a pay streak of 20 feet, which runs 33 per cent lead, 5 ounces silver, and \$12.50 gold to the ton, a combination of values pleasing to the smelters and gaining treatment at nominal cost.

GOLD KING CONSOLIDATED.

The Gold King Consolidated mines, in the Gladstone district, shipped during the year 10,100 tons of concentrates, approximating an average value of \$65. It operates its own railroad line, 9 miles in length, connecting with the Denver and Rio Grande at Silverton. The ore is a gold-iron-copper combination with desultory lead streaks in the vein, and the reserves are very large. Extraction taxes the capacity of the 80-stamp mill in use. While from 200 to 250 tons are milled daily, this company steadily pushes its development work. One hundred and thirty-five men are constantly working the upper levels, while at Gladstone extensive development work is in progress.

The new tunnel when completed will be of a length exceeding 6,000 feet, cutting all the veins at depths ranging from 500 to 2,300 feet below the surface, furnishing an almost inexhaustible area of stoping ground. The increased ore supply consequent upon the tapping at great depth of the Gold King, Sampson, and Davis veins will necessitate materially increased milling facilities for this famous producer.

OTHER PRODUCERS.

The Iowa and Tiger, in Silver Lake Basin, produced largely and consistently throughout the year, employing 175 men. While lead and silver predominate in the ore, copper and gold in paying quantities are associated. The ore is conveyed by tramway to the mill, 1½ miles distant, and the concentrates are thence trammed to the lower terminal on the Silverton-Northerly Railroad.

A WAY-UP POSTMASTER.

Arastra post-office, a domestic and international money-order office, is located at the Iowa mine and the postmaster is unquestionably the highest post-office official in the United States, conducting his business at an elevation of 12,500 feet.

SUNNYSIDE, AT EUREKA.

Toward the end of the year an exceptionally large ore body was developed in the lowest level of the Sunnyside mine in Eureka Gulch, averaging 39 feet in width, concentrated en masse, with exception of pink-rock bunches. Its components are galena, zinc, copper, and iron, the galena increasing with depth. The most abundant and richest gold streaks yet developed in the Sunnyside occur in the new ore body.

The longest tram in the county connects the Sunnyside with its lower mill, whose daily capacity is 60 tons, while the upper mill handles 30 tons.

Six tons of crude ore are reduced to one of concentrates.

The Hercules, both North Stars, Champion No 2 (now known as the Notaway Gold and Copper Mining Company) were largely paying properties during the year.

A GOOD YEAR AND AUGURS WELL.

From every standpoint the year 1901 was the banner twelve months in San Juan County's history. Outside capital, to an extent long wished for and awaited, has become permanently interested, and the immense bodies of low-grade ores can now be handled on a scale necessary to success.

The town of Silverton, of 2,500 people, is well built and inviting in appearance, and not alone the scores of tourists, but Eastern investors, in number, find it well equipped in church, school, hotel, and club facilities.

SAN MIGUEL COUNTY.

The actual results achieved in the well-known mining districts of San Miguel County during the year 1901 were highly flattering, the tonnage falling off only about 10 per cent from that of the year previous, despite the bitter labor trouble in the spring of the year, which practically tied up the county's leading producer—the Smuggler-Union—for more than three months, and the disastrous fire in November, which destroyed the buildings and tramway terminals of the same company, at the mouth of Bullion Tunnel, and caused the loss of 24 lives by suffocation, the tunnel acting as a strong flue for the ingress of heavy smoke from the burning buildings.

AGREEMENT WITH LABOR.

Happily the labor difficulty was finally adjusted, an agreement being concluded as to wages and hours of labor, which is to be held inviolate for the term of three years, and appears to guarantee stability of labor conditions in the Telluride district for at least that period, and was so hailed with delight by many operators who hesitated to advance development work or recruit their existing milling facilities with the labor market problematical, if not threatening.

The burned buildings and tram terminals have now been substantially replaced and the tunnel mouth safeguarded against a recurrence of so tragic a happening, while the great Smuggler-Union mills of 140 stamps and 500 tons capacity are again alive with the hum of industry and setting a new and high tonnage mark for the opening year.

The tonnage loss for the year was confined to the Telluride district, the only one affected by the discouraging incidents recited. Ophir, Placerville, and Saw Pit shipping points actually advanced their records some 55 carloads over 1900.

CONCENTRATES.

Concentrates formed about 90 per cent of the shipments, and as high as 20 tons of crude ore were resolved into one of shipping product by the Liberty Bell, which now successfully cyanides its tailings, thereafter passing the slimes over ingeniously designed canvas tables.

As in no former year was the stability and value of the great gold, silver, lead, and iron veins demonstrated, new work on a large scale and important sinking having been conducted by the Tomboy, Smugler, and other properties.

LARGE TRANSFERS.

As evidencing the confidence in San Miguel's ore bodies, may be quoted, among others, the following transfers of the year:

Caribbean Montezuma, \$350,000; Ophir Consolidated (additional claims), \$200,000; San Bernardo, \$200,000; Alta mines, \$175,000; Contention, \$100,000; Argentine, \$60,000; Crown Point, \$40,000; Fraction, \$25,000; Andrus, \$14,500; Champion and Chieftain, \$15,000; J. N. W., jr., \$8,500.

NEW ENTERPRISES.

The county has voted to issue bonds to cover the expense of building a wagon road from Telluride into and through Marshall and Savage basins, to terminate at the Tomboy Mill, $5\frac{1}{2}$ miles distant, at an elevation of 11,750 feet. Its completion will mean the saving of immense sums in moving ore, machinery, and supplies to and from Marshall Basin.

OPHIR CONSOLIDATED HOLDINGS.

The holdings of the Ophir Consolidated Company number 71 claims, covering all the acreage between the Butterfly-Terrible and Caribbean, about 2 miles, and boasting four of the heavily producing veins of Yellow Mountain. Development has been heretofore limited to the Silver Bell and Butler veins, old and reliable producers.

Fifty stamps additional to the 20 now in operation at the mill completed in midsummer will be immediately supplied, thus increasing its capacity to 250 tons. The concentrates are produced 1 ton from 5, and bring a smelter return of \$350 to \$500 per car, about 40 cars monthly having been shipped and four of crude ore yielding \$400 per car.

TELLURIDE POWER COMPANY.

The Telluride Power Company has 75 miles of transmission lines and 50 miles of telephone lines employed in its scientifically wonderful and commercially successful engagement to supply practically all the important mining properties of this and many of Ouray County. It has a large reserve of water, although the water power of the upper San Miguel River has been very largely developed and the capacity of its stations at Ames and Ilium is 4,000 horsepower, having a surplus of 1,500 over the horsepower at present required by its patrons.

SMUGGLER-UNION.

This company, notwithstanding the handicaps of an extended labor strike and disastrous conflagration, fell off but little in its gross product from the year previous, having milled 106,389 tons of crude ore; shipped to smelter at Durango, 15,246 tons crude ore and 9,546 tons of concentrates (dry weight); bullion consigned to mint, 23,799 ounces; the total valuation exceeding \$800,000.

Development work consisted of extending drifts and sinking shafts 3,500 feet.

SMUGGLER MILLS.

The older of its two mills at Pandora was substantially renewed and enlarged from 60 to 80 stamps, 30 of these crushing good-grade gold ore from the Contention mine, up Bear Creek, which property was purchased by the Smuggler for \$100,000 and connected with its mills by an admirable Bleichert tramway over 15,000 feet in length. From the Pennsylvania tunnel to the mills, 1 mile distant, a tram has also been constructed.

The completion of its modern cyanide plant of 98 by 225 feet ground dimensions, capable of treating 400 tons of tailings daily, will materially increase its showing the coming year. This plant has proven exceedingly successful and economical of operation.

RICH AURIFEROUS QUARTZ.

Proceeding on a drift from the Bullion tunnel, a large body of fine gold-bearing quartz was disclosed on the old Pandora vein, which will afford 200 tons per day.

The Smuggler's holdings now embrace about 50 mining claims, the large majority being of a character promising the existence of good bodies. It also owns a very large acreage in process of patenting.

TOMBOY GOLD MINES.

The Tomboy Company during 1901 shipped over 4,800 tons of concentrates and nearly 50,000 ounces of gold bullion, the total valuation of its production exceeding \$800,000.

The mine levels were extended over 4,000 feet, and in the different workings 7,000 feet of development done. Much of the tonnage was from the stopes over the 300-foot level, the reserve there having been depleted about 30,000 tons. Manager Herron's estimate of available ore over the 300-foot level is 25,000 tons.

Toward the year's close milling was inaugurated from the low-grade stopes over the 500-foot level, a large body having been proven in that territory. The present stopes of the shaft levels are believed to indicate 15,000 available tons.

PURCHASES.

This company has purchased the Argentine Nos. 1 and 2 lode claims, Fraction and Red Cloud claims, and Argentine Nos. 1 and 2 mill sites. Two thousand feet of development was accomplished on the Argentine and 1,000 feet on the Cincinnati, also carrying the Argentine vein.

NEW YEAR PLANS.

The Tom-boy Company purposes the speedy erection of a finely equipped 60-stamp mill, which will virtually double its milling capacity.

LIBERTY BELL.

The splendid mill of the Liberty Bell Gold Mining Company, located just without the city limit of Telluride, treated during 1901 approximately 70,000 tons of ore, which yielded 1,020 tons of dry concentrates, 21,550 ounces gold bullion, 35,000 ounces bullion from cyanide plant.

SCIENTIFIC ECONOMY.

The Liberty Bell property strikingly exemplifies the rewards of scientific economical operation. Its ore deposits, while large and continuous, are of quite low grade; but handsome profits are realized because the entire cost of mining, milling, and transportation has been reduced to \$3.50 per ton.

The past year's development work aggregated 2,500 feet.

The company's milling plant is thoroughly up to date, comprising 80 stamps, extensive concentrating machinery, and a fine cyanide adjunct, with daily capacity of 300 tons. A clever and profitable slimes plant of 100 tons capacity is handling the residuum of the cyanide plant.

The long gravity tram of this company is replete with interest.

What is known as the Stillwell Tunnel is being pushed from one of its curve stations to open the vein 900 feet below present workings and 2,000 feet from surface.

KEYSTONE PLACERS.

The Keystone Hydraulic Mining Company is prepared to begin extensive operations on the San Miguel River in the spring of 1902. It has under construction a dam across the East Fork of the San Miguel River, a 2,500-foot flume 6 by 12, and is installing an adequate pipe line. Two 10-inch giant nozzles will be placed, capable of washing 12,000 to 20,000 cubic feet of gravel daily, which has been sampled and shown to carry from 10 cents in surface dirt per yard to \$1.50 in bed rock.

OTHER PROPERTIES.

The Japan Mines, whose veins extend directly across the flat portion of Savage Basin, were not worked for a profit the past year. The water problem has been found very serious, and an expensive drainage tunnel, 4,000 feet long, is being pushed to cut the vein about 500 feet below old workings.

BUTTERFLY-TERRIBLE.

The Butterfly-Terrible properties, on the western extremity of Yellow Mountain, during the year advanced development about 1,000 feet, laid a 1,200-foot pipe line from Wilson Creek to the mill flume, and strengthened its milling plant, which treated 14,825 tons of ore, yielding 20 per cent in concentrates and the remainder free gold.

SUMMIT COUNTY.

During the year the mines and prospects of Summit County have been vigorously and intelligently developed. The amount of ore shipped is but a poor criterion of the county's mining prosperity.

At Breckenridge, two deep shafts are being sunk to discover the continuation of the Leadville sulphide belt. The indications are encouraging.

TEN-MILE DISTRICT.

This embraces the camps of Frisco, Robinson, and Kokomo. Considerable high and low grade smelting ore was produced during the year, carrying values in silver and lead with some gold. The Robinson Mining and Smelting Company has nearly finished its new smelter, which will be an important addition to the district. This plant will handle the low grades of iron and sulphide ore.

Nigger and Mineral Hills have some good producers of lead and silver, carrying fair values in gold.

Montezuma district is handicapped by the lack of railroad transportation, a long wagon haul being necessary to market the ores.

The veins are large and are rich in silver, with some gold.

Farncomb Hill continues to produce rich free and crystallized gold, but with a limited output. Properties worked principally by leasers. During the year many mines made small shipments and are well developed for future operations.

The Denver Smelting and Milling Company handles about 90 per cent of the Breckenridge ores. Numerous private mills treat the ores of their own properties.

GOLD PAN PLACERS.

The Gold Pan Mining Company at Breckenridge has the most complete plant for placer mining in the State.

The company owns about 1,700 acres with ample water rights.

Water is taken out of the Blue River, about 4 miles above the lower end of the placer, by means of ditches and about 2 miles of steel pipe 5 feet in diameter. At the end of this pipe line a system of Evans hydraulic elevators has been installed. These elevators work down to bed rock and carry the gravel to the sluices above.

Through these elevators the water will have a pressure of 150 pounds to the square inch under a head of 350 feet. With the four Evans elevators and giants already in place, the company proposes to start the coming season with capacity to handle 6,000 to 8,000 cubic yards of gravel a day.

Two steel derricks over 100 feet high are to be used in removing boulders and heavy débris. Each derrick will be equipped with guy ropes, carriers, and necessary engines and are great labor-saving devices.

During the year the gravel beds were thoroughly prospected by means of drills and sand pumps, with gratifying results to those interested.

The average depth of gravel is 60 feet. The plant has every modern money and labor saving device.

THE GOLD PAN ENGINEERING AND MINE SUPPLY COMPANY.

This company is located at Breckenridge and is one of the most complete plants of its kind in the country.

Pipe making for the placer mines was the principal reason for building the plant, but owing to demands its scope has been broadened and it furnishes everything in the mine-supply line as well as job work on machinery. The company furnishes the town of Breckenridge with electric light and also some of the mines with power. The plant has the most improved machinery, embracing steam hammers, rolls, riveters, planer's shears, and lathes. A compressed-air plant furnishes power in the machine shop and is also used in the placer mine.

OTHER PLACERS.

The Mecca Placer Company is in French Gulch, at Breckenridge. The Company has put in 3,000 feet of 60-inch pipe and installed Evans hydraulic elevators. In the past this ground has furnished large returns in nuggets and fine gold.

The Blue River Company owns a large acreage of placer ground north of Breckenridge. During the season steam excavators made a good opening to bed rock, and the company is in shape to make a fine showing next season.

The Oro Grande Placer Company has put in a hydraulic elevator and a new pipe line. This property is near Dillon.

The American Gold Dredging Company is on the Swan River. The operations of the last year were highly successful. Evans elevators, giants, and dredges were used.

TELLER COUNTY (CRIPPLE CREEK DISTRICT).

The Cripple Creek district, which comprises Altman, Bull Hill, Elkton, Arequea, Gillette, Goldfield, Victor, Cripple Creek, and other mining camps, has become so well known from its large and steadily increasing annual ore output and bullion products that there may be little to report outside of what is already well understood.

The Elkton Consolidated Mining and Milling Company, on Raven Hill, operates its property through a vertical shaft that has a depth of 800 feet in three compartments, timbered in square-set system from top to bottom.

Eight levels have been opened. It is believed that levels 1 to 5, inclusive, have been worked out, while levels 6 to 8, inclusive, are in active production. The ore is principally sylvanite, and, as now sorted for shipment, has an average value of \$60 per ton in gold; no silver. The vein has a width varying up to 6 feet.

Loading for shipment is from ore house direct into railway cars of the Midland Terminal, also the Colorado Springs and Cripple Creek Short Line.

About two-thirds of the ore is shipped to smelting works and one-third to the chlorination plants at Colorado City. These ore shipments aggregate 2,000 tons per month. With increased depth it is found that the Elkton vein increases in quantity, also in metal values.

During the year 1901 there was expended in improvements \$150,000. The gross output from the mine was about \$1,250,000.

An average of 280 men are employed, the day of twenty-four hours being divided into three shifts. The miners work eight hours and

receive \$3. Blacksmiths, machine and pump men receive \$4, and engineers \$4.50 per day.

Steam furnishes the power for running the mine hoist of 2 double-deck cages, 4 pumps of large capacity, air-compressor machine, drills, and ventilation.

STRATTON INDEPENDENCE COMPANY, LIMITED.

The decrease in value of the output from the Independence mine in 1901 is attributed to the first operations by the company, an English organization, being expended in extraction of the high-grade ore only, and leaving the lower grades in place, so that the output from the Independence has been of a considerably less value, or at an average of \$31 in gold per ton.

The greatest depth attained is 1,400 feet, and with depth the quantity of the ore has increased. The width ranges from 2 feet even up to 40 feet. Granite, porphyry, phonolite, and breccia carry the mineral sylvanite disseminated throughout the mass, which, from sorting, gives a result of about 40 per cent in ore to 60 per cent waste. The ore output is about 9,000 tons per month, and the development of new mineral-bearing area in advance is now regularly carried forward.

The timbering of underground excavations is mainly of the square-set system, equaling 2,000,000 feet per annum.

Compound condensing pumps are used, 2 with capacity of 1,000 gallons per minute at 1,000 feet, 6 sinking pumps, also small station pumps.

An average of 420 men are employed, working eight-hour shifts. Wages paid range from \$3 to \$5 per day, according to the character of the work.

Drifts were started below 900-foot level in 1901, the mineral output being from 900-foot level up; development of new ground in other levels was about 19,000 feet.

The ores shipped are treated by chlorination process at works in Colorado City.

STRATTON'S ACQUISITIONS.

The groups of mining claims known as the American Eagle, John A. Logan, Opha May, Lucky Guss, Longfellow, Six Points, Plymouth Rock, Deerhorn, Abe Lincoln, Collier, Chicago, and Cripple Creek tunnel, purchased by the Stratton Cripple Creek Mining and Development Company during the year 1901, are now under active operation, and other claims owned by same party will soon be placed in operation.

The work now in progress on the above-mentioned properties partakes mainly of systematic betterment of the premises and development of bodies in view of placing the several properties in condition to make regular mineral outputs, the aim at present being to produce about enough ore to meet current expenses. There are 425 men employed; wages, \$3.

The development work of all mining claims is under skilled supervision. Foremen of experience are in charge of individual groups and shift bosses of each set of miners and coworkers.

THE STRATTON POLICY.

The published report that Mr. W. S. Stratton would grant leases on such of his properties as are at present idle is erroneous. Mr. Strat-

ton, after his successful experience, has formulated plans of operation and determined to put them in force, and this decision is strengthened by the results in sight within his territory above named.

Ore hoists and air compressors are driven wholly by steam power; machine drills by compressed air.

The consumption of explosives aggregate about 1,000 pounds per day.

The mineral veins are fissure, running north and south, and carry the mineral sylvanite.

The Plymouth Rock is made the central point from which all business of the Stratton Company is transacted.

PLYMOUTH ROCK.

The Plymouth Rock property is worked through a three-compartment shaft now at a depth of 500 feet. It is a fissure vein, running north and south, in granite. The vein filling is of a variable material, portions like sandstone, also in some quite appreciable degree in loose granules, and small portions solid, the whole forming a so-called low-grade ore, carrying sylvanite. Assays vary up to $1\frac{1}{2}$ ounces gold per ton.

AMERICAN EAGLE.

The American Eagle is located and opened on top of Bull Hill and exhibits the best bodies of ore thus far opened in any of the Stratton groups.

The American Eagle is a fissure running north and south in granite formation. The greatest values are in sylvanite and free gold in a soft talc-like substance. These values began at a depth of 800 feet in the shaft and continue as depth is gained, which is now 1,500 feet.

The mineralized vein material has not yet been uncovered to its full width, but is now from 15 to 20 feet. Indications are believed very favorable that it extends to a greater depth.

The ore output is extracted from crosscuts above bottom of shaft and carries a value as high as 10 ounces per ton. The aim is to hold ore shipments in the main down to 2 or 3 ounces gold per ton. Silver is present, but not to any appreciable value.

CHEMICAL PLANTS.

Under present arrangements the chlorinating plants at Colorado City get the ore up to 2 ounces gold per ton, except on unexpired contracts, which were 5 ounces gold per ton. The Stratton C. C. M. & D. Company will lay rails between its mines and established railways. Ores that contain 2 ounces silver and over, regardless of their gold contents, go to smelting works. Unless the ore contains 2 ounces silver no payment is made for silver.

There are several ore-sampling works at Cripple Creek, but none of them in operation, for ores of that locality are shipped direct to some one of the several ore-reduction works at Colorado City or Florence, of which the chlorination plants are treating a considerably larger ore tonnage than the cyanide plants.

The Economic chlorinating plant, located in Eclipse Gulch, erected and operated by the Woods Investment Company, is treating 300 tons of ore per day from the company's own mines and those under its control.

THE PORTLAND REPORT.

The Portland Gold Mining Company has just issued its annual report to shareholders showing that the ore output for 1901 was 76,906 tons, and had a gross value of \$2,408,413.23.

The amount of mine excavation was: In shafts, 337 feet; winzes, 551 feet; upraises, 1,209 feet; drifts, 9,785 feet; crosscuts, 6,067 feet; tunnels, 581 feet.

The amount of lumber used was upward of 2,000,000 feet and 120 carloads of round timbers. The company have in their employ a force of 700 men.

The Portland has in construction a chlorinating plant of 300 tons ore capacity, which will be in operation early in 1902.

There are four ore-sampling works in operation at Goldfield and Victor.

All deep mines of the Cripple Creek district use large quantities of timber, although the average of the ground stands well.

OUTPUT AROUND VICTOR.

The ore output from Victor is from 40,000 to 50,000 tons per month, of which 5,000 to 8,000 tons are from operations of those workings under a leasing system.

There was not, as yet known, any new mineral territory opened within or near the limits of Cripple Creek district during 1901, although in a northerly direction there are quite promising indications with investigation in progress.

DECREASED VALUES.

There is a tendency in the deeper workings of Cripple Creek mines to change to sulphides and then retain their gold values. The general average of values has decreased somewhat, while the quantity of mineral has increased.

The working of mining property under leases is at about 5 per cent, with a flat royalty of 25 per cent on all grades of ore.

Electric hoists are largely in use at the smaller mines, furnished by an electric power plant transmitted from several district stations.

All large mines use steam power. Coal fields are distant 40 miles, from which lignite is delivered at mine premises for \$3.50 per ton, and bituminous, according to quality, at \$4.50 to \$6.50 per ton.

During 1901 there have been no labor strikes nor disasters.

FINE RAILWAY FACILITIES.

The railway facilities are unsurpassed. The Florence and Cripple Creek, a branch of the Rio Grande system, the Midland Terminal, and the Colorado Springs Short Line all serve to reach the mines, so arranged that the ores are loaded direct from the mines into cars for shipment without the intervening costs of wagon haul. These lines also run suburban passenger trains each hour. In addition to this service an electric company runs local passenger cars with two lines between Cripple Creek and Victor, one—the High Line—passing the mines, located at 10,000 to 11,000 feet altitude, and the other, Lower, or Central line. Consequently, the winding in and around the contour surface of the mountain sides by railways affords a most excellent

service in the shipment of ores, receipt of all mine supplies, and the prompt transaction of business affairs, leaving only few long and short wagon hauls.

Smelting works and chemical mills receive their crude ore supplies through the same purchasing department and at the same rates.

TOTAL PRODUCTION OF COLORADO, 1901.

County.	Gold (value).	Silver (coining value).	Total value, gold and silver.	Lead (value).	Copper (value).	Total value.
Boulder.....	\$774, 293	\$146, 772	\$921, 065	\$8, 319	\$3, 673	\$933, 057
Chaffee.....	158, 697	98, 403	257, 100	8, 875	95, 398	361, 373
Clear Creek.....	540, 969	1, 639, 882	2, 180, 851	168, 567	62, 004	2, 411, 422
Conejos.....	139	2	141	.....	.....	141
Costilla.....	147	3	150	.....	14	164
Custer.....	11, 117	65, 008	76, 125	17, 352	6, 709	100, 186
Dolores.....	22, 290	144, 003	166, 293	15, 904	2, 170	184, 367
Eagle.....	97, 402	225, 983	323, 385	120, 260	26, 143	469, 788
Fremont.....	258	557	815	1, 467	2, 633	4, 915
Gilpin.....	1, 638, 971	350, 340	1, 989, 311	28, 822	121, 049	2, 139, 182
Garfield.....	147	4	151	.....	.....	151
Gunnison.....	83, 229	120, 285	203, 514	28, 449	8, 840	240, 803
Hinsdale.....	76, 143	196, 237	272, 380	328, 828	2, 075	603, 283
Lake.....	1, 775, 802	8, 810, 284	10, 586, 086	2, 442, 196	381, 341	13, 409, 623
La Plata.....	27, 199	7, 120	34, 319	266	.....	34, 585
Larimer.....	522	17	539	.....	3, 003	3, 542
Mineral.....	102, 813	2, 342, 670	2, 445, 483	455, 846	150	2, 901, 479
Montrose.....	1, 330	130, 624	131, 954	.....	9, 262	141, 216
Mesa.....	1, 940	69	2, 009	.....	1, 290	3, 299
Ouray.....	1, 530, 811	2, 074, 840	3, 605, 651	342, 526	90, 569	4, 038, 746
Park.....	96, 321	89, 233	185, 554	18, 283	1, 599	205, 436
Pitkin.....	2, 636	4, 557, 392	4, 560, 028	1, 419, 216	8, 407	5, 987, 651
Rio Grande.....	32, 916	8, 934	41, 850	.....	10, 860	52, 710
Routt.....	2, 848	179	3, 027	93	.....	3, 120
Saguache.....	79, 973	26, 422	106, 395	10, 215	2, 525	119, 135
San Juan.....	1, 019, 368	1, 180, 744	2, 200, 112	670, 595	578, 029	3, 448, 736
San Miguel.....	2, 077, 712	1, 183, 876	3, 261, 588	144, 855	51, 356	3, 457, 799
Summit.....	338, 741	475, 853	814, 594	188, 196	2, 824	1, 005, 614
Teller.....	17, 261, 579	117, 241	17, 378, 820	.....	.....	17, 378, 820
Total.....	27, 756, 313	23, 992, 977	51, 749, 290	6, 419, 130	1, 471, 923	59, 640, 343

SOURCE OF PRODUCTION.

Gold:	
Placer bullion.....	\$600, 000
From chlorination mills.....	7, 689, 405
From cyanide mills.....	900, 547
From dry and copper ores.....	13, 924, 771
From lead or wet ores.....	4, 641, 590
Total.....	27, 756, 313

Silver (coining value):	
From quartz.....	5, 998, 244
From lead and copper ores.....	17, 994, 733
Total.....	23, 992, 977

BULLION OF COLORADO PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1901.

Institution.	Gold (value).	Silver (value).	Total value.
Mints:			
Denver.....	\$15, 507, 151. 66	\$34, 041. 81	\$15, 541, 193. 47
Philadelphia.....	2, 241. 00	29. 85	2, 270. 85
San Francisco.....	7, 269. 85	166. 86	7, 436. 71
Assay offices:			
New York.....	10, 281. 36	1, 304. 69	11, 586. 05
Seattle.....	166. 56	1. 04	167. 60
Total.....	15, 527, 110. 43	35, 544. 25	15, 562, 654. 68

STATEMENT OF BULLION OPERATED ON AT THE UNITED STATES MINT, DENVER, COLO.,
DURING THE CALENDAR YEAR 1901.

COLORADO.

County.	Gold.	Silver.	Total.
Boulder	\$67,552.08	\$373.52	\$67,925.60
Clear Creek	10,600.91	90.78	10,691.69
Chaffee	54,085.40	229.93	54,315.33
Conejos	139.16	1.15	140.31
Costilla	126.14	.41	126.55
Dolores	1,899.06	14.37	1,913.43
Eagle	249.71	.82	250.53
Gilpin	454,124.15	2,722.93	456,847.08
Gunnison	140.65	.97	141.62
Garfield	146.67	1.55	148.22
Hinsdale	42.28	1.06	43.34
Lake	13,482.80	118.20	13,601.00
La Plata	10,020.79	50.32	10,071.11
Mesa	1,939.63	19.15	1,958.78
Montrose	301.48	3.11	304.59
Ouray	978,248.75	10,468.64	988,717.39
Park	18,708.89	113.28	18,822.17
Pitkin	350.09	2.23	352.32
Rio Grande	259.46	1.22	260.68
Routt	926.73	1.08	927.81
Sagauche	77,456.95	1,230.01	78,686.96
San Juan	18,191.09	131.45	18,322.54
San Miguel	1,165,263.46	14,987.84	1,180,251.30
Summit	67,014.79	491.66	67,506.45
Teller	8,658,106.73	1,500.35	8,659,607.08
County unknown	27,758.21	381.69	28,139.90
Total Colorado	11,627,136.06	32,937.72	11,660,073.78
Smelters	3,880,015.58	1,104.09	3,881,119.67

FOREIGN TO COLORADO.

State or Territory.	Gold.	Silver.	Total.
Alaska	\$2,669.18	\$19.69	\$2,688.87
Arizona	371,178.48	6,662.75	377,841.23
British Columbia	427.51	4.92	432.43
California	2,767.68	32.50	2,800.18
Idaho	2,111.86	4.50	2,116.36
Mexico	872.75	43.90	916.65
Montana	777.36	3.24	780.60
Nevada	161.95	1.33	163.28
New Mexico	159,880.17	898.71	160,778.88
Oregon	1,135.86	7.98	1,143.84
South Dakota	8,290.66	31.72	8,322.38
Utah	50,716.09	245.10	50,961.19
Washington	536.45	3.58	540.03
Wyoming	10,956.57	23.45	10,980.02
Total	612,482.57	7,983.37	620,465.94

MISCELLANEOUS.

Description.	Gold.	Silver.	Total.
Jewelry	\$26,573.27	\$230.19	\$26,803.46
United States coin	122.99	.....	122.99
Redeposit	621.79	6.52	628.31
Total	27,318.05	236.71	27,554.76

STATEMENT OF BULLION OPERATED ON AT THE UNITED STATES MINT, DENVER, COLO.,
DURING THE CALENDAR YEAR 1901—Continued.

RECAPITULATION.

	Gold.	Silver.	Total.
Colorado (including smelters)	\$15,507,151.66	\$34,041.81	\$15,541,193.47
Foreign to Colorado	612,482.57	7,983.37	620,465.94
Miscellaneous	27,318.05	236.91	27,554.96
Total	16,146,952.28	42,262.09	16,189,214.37

COIN VALUE OF THE GOLD AND SILVER PRODUCED IN COLORADO FROM 1859 TO 1901,
INCLUSIVE.

Year or period.	Gold.	Silver.	Total.
1859 to 1870	\$27,213,081.00	\$330,000.00	\$27,543,081.00
1870	2,000,000.00	650,000.00	2,650,000.00
1871	2,000,000.00	1,029,046.34	3,029,046.34
1872	1,725,000.00	2,015,000.00	3,740,000.00
1873	1,750,000.00	2,185,000.00	3,935,000.00
1874	2,002,487.00	3,096,023.00	5,098,510.00
1875	2,161,475.02	3,122,912.00	5,284,387.02
1876	2,726,315.82	3,315,592.00	6,041,907.82
1877	3,148,707.56	3,726,379.33	6,875,086.89
1878	3,240,384.36	6,041,807.81	9,282,192.17
1879	2,920,326.43	12,068,930.27	14,989,256.70
1880	3,206,500.00	18,615,000.00	21,821,500.00
1881	3,300,000.00	17,160,000.00	20,460,000.00
1882	3,360,000.00	16,500,000.00	19,860,000.00
1883	4,100,000.00	17,370,000.00	21,470,000.00
1884	4,300,000.00	16,000,000.00	20,300,000.00
1885	4,165,794.00	15,824,557.00	19,990,351.00
1886	4,446,417.07	18,209,406.40	22,655,823.47
1887	4,874,387.66	15,668,236.65	20,542,624.31
1888	3,758,098.46	24,272,949.44	28,031,047.90
1889	3,636,218.00	26,559,058.00	30,195,276.00
1890	4,016,229.00	25,788,819.00	29,805,048.00
1891	4,767,880.00	27,295,093.00	32,062,973.00
1892	5,539,021.00	31,478,972.00	37,017,993.00
1893	7,487,071.00	29,452,882.00	36,939,953.00
1894	10,616,463.00	30,704,375.00	41,320,838.00
1895	15,013,434.00	31,075,314.00	46,088,748.00
1896	15,110,959.00	27,859,042.00	42,970,001.00
1897	19,572,137.00	27,178,475.00	46,750,612.00
1898	23,512,819.00	29,971,830.00	53,484,649.00
1899	26,265,487.00	29,679,706.00	55,945,193.00
1900	28,869,392.00	26,998,928.00	55,868,320.00
1901	27,756,313.00	23,992,977.00	51,749,290.00
Total	278,562,397.38	565,236,311.24	843,798,708.62

IDAHO.

By J. W. CUNNINGHAM,

Assayer in charge United States assay office at Boise, Idaho.

The production of the precious metals in Idaho during the calendar year 1901 is shown in detail in the various tables hereto appended.

It is believed that this data can be fully relied upon as being correct, as all estimates and exaggerations have been avoided and only the information from mine owners and other reliable sources has been made use of in this compilation.

The result shows a decrease in all of the metals as compared with the previous year. This is due to various causes, all of which are but temporary. It is expected that the production for the succeeding year will be much greater.

The Thunder Mountain district, in the interior of the State, in Idaho County, is attracting considerable attention, and if signs do not fail there will be on the opening of the next season a rush to this camp second only to that on the discovery of gold in the Klondike.

Little, however, is known of the richness and character of the deposits of this region. It is a late discovery, and the country is not readily accessible. Speculation is rife, even to the point of recklessness, in actual sales made and claims of richness of the prospects.

As yet the ore bodies have not been explored, but the indications are that the district will prove to be exceptionally rich.

PRODUCT OF GOLD AND SILVER IN IDAHO, BY COUNTIES, DURING CALENDAR YEAR 1901.

County.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Value (coining value).	
Ada	1,032	\$21,333	517	\$668	\$22,001
Bannock	182	3,762	48	62	3,824
Bingham	639	13,209	64	83	13,292
Blaine	939	19,411	99,186	128,240	147,651
Boise	18,104	374,243	6,325	8,178	382,421
Cassia	1,758	36,341	215	278	36,619
Custer	897	18,543	73,086	94,495	113,038
Elmore	4,457	92,134	2,209	2,856	94,990
Idaho	7,810	161,448	3,008	3,889	165,337
Lemhi	10,355	214,057	2,238	2,894	216,951
Lincoln	1,979	40,910	198	256	41,166
Oneida	485	10,026	94	122	10,148
Owyhee	38,912	804,382	1,065,167	1,377,186	2,181,568
Shoshone	4,915	101,602	4,339,296	5,610,403	5,712,005
Washington	286	5,912	83	107	6,019
Total	92,750	1,917,313	5,591,734	7,229,717	9,147,030

TOTAL PRODUCT OF IDAHO DURING CALENDAR YEAR 1901.

Metal.	Quantity.	Value.
Gold	92,750	\$1,917,313
Silver	5,591,734	7,229,717
Lead	162,553,069	7,314,888
Total value		16,461,918

DISTRIBUTION OF THE GOLD AND SILVER PRODUCT OF IDAHO FOR THE CALENDAR YEAR 1901 AS TO SOURCES OF PRODUCTION.

Gold:	Fine ounces
Quartz	56,289
Placer	36,461
Silver:	
Quartz	1,080,352
Lead ores	4,511,382

GOLD AND SILVER PRODUCED IN IDAHO DEPOSITED WITH GOVERNMENT INSTITUTIONS DURING THE CALENDAR YEAR 1901.

Mints and assay offices.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Value.	
Mints:					
San Francisco	508.894	\$9,467.80	109.41	\$127.31	\$9,595.11
Philadelphia	365.088	6,792.33	85.41	99.39	6,891.72
Denver	113.514	2,111.89	8.54	9.94	2,121.83
Assay offices:					
Boise	39,622.150	737,154.78	12,177.71	14,170.42	751,325.20
Helena	7,429.378	138,220.99	1,746.54	2,032.33	140,253.32
New York	65.965	1,227.25	18.94	22.04	1,249.29
Seattle	300.279	5,586.58	72.41	84.26	5,670.84
Total	48,405.268	900,561.62	14,218.96	16,545.69	917,107.31

SOURCES OF THE DEPOSITS AT THE UNITED STATES ASSAY OFFICE, BOISE, IDAHO, FOR THE CALENDAR YEAR 1901.

County.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Ada	597.295	\$12,347.09	312.43	\$403.95	\$12,751.04
Bannock	56.922	1,176.58	5.02	6.49	1,183.07
Bingham	316.981	6,552.48	11.59	14.98	6,567.46
Blaine	226.649	4,685.15	104.63	135.28	4,820.43
Boise	14,604.168	301,894.86	4,005.20	5,178.44	307,073.30
Cassia	1,508.251	31,178.22	95.07	122.92	31,301.14
Custer	475.444	9,828.20	279.36	361.19	10,189.39
Elmore	3,457.307	71,468.78	1,509.09	1,951.15	73,419.93
Idaho	3,700.020	76,486.11	1,402.88	1,813.82	78,299.93
Lenhi	3,664.783	75,757.69	352.21	455.38	76,213.07
Lincoln	1,833.715	37,906.15	124.18	160.56	38,066.71
Oneida	164.671	3,403.95	10.69	13.82	3,417.77
Owyhee	2,212.542	45,737.20	1,842.79	2,382.60	48,119.80
Shoshone	2,630.359	54,374.25	854.23	1,104.46	55,478.71
Washington	210.826	4,358.07	50.57	65.38	4,423.45
Total Idaho	35,659.935	737,154.78	10,959.94	14,170.42	751,325.20
Montana	6,853.537	141,674.43	702.67	908.51	142,582.94
Oregon	42,593.856	880,491.64	14,625.47	18,909.69	899,401.33
Utah	530.944	10,975.35	119.55	154.56	11,129.91
Washington	195.850	4,048.42	36.16	46.75	4,095.17
Northwest Territory	102.515	2,119.16	29.44	38.06	2,157.22
Total	85,936.637	1,776,463.78	26,473.23	34,227.99	1,810,691.77

MONTANA.

By B. H. TATEM,

Assayer in charge United States assay office, Helena, Mont.

The value of the metallic production of Montana during 1901 was \$60,387,619.01. This aggregate consists of the gold, silver, copper, and lead won from metal mining, and was distributed as shown in the table which follows:

Metals.	Quantity.	Value.
Gold.....fine ounces..	232,331.454	\$4,802,717.39
Silver (coining rate) .....do.....	14,180,545.19	18,334,442.26
Copper (at \$16.117 per hundredweight).....fine pounds..	228,031,503	36,751,837.34
Lead (at \$4.334 per hundredweight) .....do.....	11,504,892	498,622.01
Total.....		60,387,619.00

When compared with the production of the preceding year, a decrease of about \$3,000,000 is to be noted in the comparison which follows, nearly all of which, however, was due to a lessened production of copper and a lower price for this metal.

Metals.	1900.		1901.		Increase (+) or decrease (-).
	Quantity.	Value.	Quantity.	Value.	
Gold.....fine ounces..	229,114.882	\$4,736,224.95	232,331.454	\$4,802,717.39	+ \$66,492.44
Silver (coining value), fine ounces.....	14,294,835.11	18,482,211.05	14,180,545.19	18,334,442.26	— 147,768.79
Copper.....fine pounds..	245,998,365	39,827,135.29	228,031,503	36,751,837.34	—3,075,297.95
Lead.....do.....	16,044,751	701,155.62	11,504,892	498,622.02	— 202,533.60
Total.....		63,746,726.91		60,387,619.01	—3,359,107.90

Since the discovery of gold in the State, not yet forty years ago, more than \$1,000,000,000 in value of these metals have been taken from the streams and mountains of the State. No careful compilations were made prior to 1882, but the figures of this output as given in the following table for that period are as reliable as can be obtained and have long been accepted as correct. Those shown for the subsequent years are from the statistics as compiled by the Bureau of the Mint.

PRODUCTION OF GOLD, SILVER, COPPER, AND LEAD IN THE STATE OF MONTANA FROM THE YEAR 1862 TO 1901, INCLUSIVE.

Year.	Gold.	Silver (coin- ing value).	Copper.	Lead.	Total.	Yearly in- crease (+) or de- crease (-).
1862 to 1881, inclu- sive ^a	\$200,000,000	\$11,000,000	.....	.....	\$211,000,000	<i>Per cent.</i>
1882.....	2,550,000	4,370,000	\$1,539,860	.....	8,459,860	.....
1883.....	1,800,000	6,000,000	3,452,960	\$226,424	11,479,384	+37½
1884.....	2,170,000	7,000,000	5,386,500	246,326	14,802,826	+31
1885.....	3,400,000	11,500,000	6,779,800	274,350	21,954,150	+50
1886.....	4,422,000	13,849,000	5,761,200	494,132	24,526,332	+12
1887.....	5,978,536	17,817,548	8,853,750	607,662	33,257,496	+35½
1888.....	4,200,253	15,790,736	15,103,946	569,160	35,664,095	+7½
1889.....	3,500,000	19,393,939	13,334,970	456,975	36,685,884	+3
1890.....	3,300,000	20,363,636	16,656,437	675,392	40,995,465	+11½
1891.....	2,890,000	20,139,394	14,377,336	1,229,027	38,635,757	+5½
1892.....	2,891,386	22,432,323	19,105,464	990,035	45,419,208	+18
1893.....	3,576,000	21,858,780	16,630,958	964,089	43,029,827	-5
1894.....	3,651,410	16,575,458	17,233,718	730,551	38,191,137	-11
1895.....	4,327,040	22,886,992	21,114,869	754,360	49,083,261	+28½
1896.....	4,380,671	20,324,877	25,356,541	670,010	50,732,099	+3½
1897.....	4,496,431	21,730,710	26,798,915	928,619	53,954,675	+6
1898.....	5,247,913	19,159,482	26,102,616	809,056	51,319,067	-5
1899.....	4,819,157	21,786,835	40,941,906	909,410	68,457,308	-33
1900.....	4,736,225	18,482,211	39,827,135	701,156	63,746,727	-7
1901.....	4,802,717	18,334,443	36,751,837	498,622	60,387,619	-5
Total.....	277,139,739	350,796,364	361,110,718	12,735,356	1,001,782,177	.....

^a No annual compilations were made prior to 1881.

An analysis of the preceding figures leads one, even though unacquainted with the history of the State, to give to the industry the importance to which it is rightly entitled. To those actually concerned in the production of these metals throughout the State the above figures offer much of satisfaction for the past and encouragement for the future.

Little change in the value of the gold produced in 1901 is shown, yet the enlarged use of cyanide to win this precious metal from Montana ore during 1901 merits notice. The principal scene of new activity was Fergus County. If the future operations result as now believed, this field will materially aid in maintaining the output of gold in the State, if, indeed, it does not result in increasing the same in the future. Had it not been for what already is accomplished in that section, the total yield of gold in the past year would have decreased, the increased values from milling and cyanide ores fortunately overbalancing the decrease from the smelting ores and placers.

The gold won in the years 1900 and 1901 originated from the sources shown below, the increase or decrease also being indicated.

Classification.	1900.		1901.		Increase (+) or decrease (-).
	Weight.	Value.	Weight.	Value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Placer bullion.....	26,709.214	\$552,128.45	25,285.602	\$522,699.78	-\$29,428.67
Mill bullion.....	70,350.342	1,454,270.64	72,961.647	1,508,251.10	+53,980.46
Cyanides.....	42,923.697	887,311.57	57,013.558	1,178,574.84	+291,263.27
From copper ores.....	51,252.098	1,121,490.40	45,850.574	947,815.48	-173,674.92
From lead ores.....	7,918.654	163,693.10	6,479.641	133,946.07	-29,747.03
In smelting ores.....	26,960.877	557,330.79	24,740.432	511,430.12	-45,900.67
Total.....	229,114.882	4,736,224.95	232,331.454	4,802,717.39	+66,492.44

A perusal of the above table shows but little change in the amounts of gold won from the several classes of mining, the difference in each

case being small, and indicates practically no change from that of the previous year.

What has been said of gold can likewise be said of silver, viz, that but little change occurred during the year in the amount of this metal won from any of the different branches of mining except that derived from lead ores. This large decrease is principally due to the closing of the American Smelting and Refining Company's plant, near Great Falls, Mont., compelling the mining of lead ores in that section to cease temporarily.

The changes that occurred in the output of silver during the years 1900 and 1901 may be seen in the table which follows:

Classification.	1900.		1901.		Increase (+) or decrease (-).
	Weight.	Coining value.	Weight.	Coining value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Placer bullion.....	3,252.20	\$4,204.86	2,730.78	\$3,530.70	— \$674.16
Mill bullion	1,766,692.59	2,284,208.60	2,042,990.48	2,641,442.24	+ 257,233.64
Cyanides.....	109,452.68	141,514.58	126,492.27	163,545.56	+ 22,030.98
From copper ores.....	9,324,085.39	12,055,383.13	10,136,892.57	13,106,285.34	+1,050,902.21
From lead ores.....	2,134,802.18	2,760,148.27	397,029.03	513,330.47	—2,246,817.80
From smelting ores.....	956,550.07	1,236,751.61	1,474,410.06	1,906,307.95	+ 669,556.34
Total	14,294,835.11	18,482,211.05	14,180,545.19	18,334,442.26	— 147,768.79

Although the total amount of silver produced for some years in this State is enormous, it has nearly all been a by-product incident to other mining. The mining of ores, carrying their values exclusively in silver, was done in the Philipsburg and Elkhorn districts, where large and valuable deposits of silver ore have long been worked successfully.

Lead mining in Montana is of small importance, the aggregate production being but a trifle proportionately. Copper mining was continued on the usual large scale of recent years in the Butte district, little or no noteworthy features having occurred therein.

BEAVERHEAD COUNTY.

Occupying the southwestern part of the State, this county has been a producer of considerable prominence since 1862.

Gold in considerable quantities was first mined in the State at Banack. Mining operations in 1901 were devoid of unusual features. For some years large dredging machines have been working the channel of Grasshopper Creek and winning much gold that was left there in the early days when machinery was not available. These dredges worked throughout the season of 1901, their gold output being practically that of recent years.

The large operations of the Hecla Consolidated Mining Company that formerly characterized the district around Glendale have for some years been growing of less importance owing to the obstacles in the discovery and development of the ore bodies. In 1901 these conditions were unchanged. Considerable prospecting is being done in the mining sections of the county, the results being encouraging and may lead to the development of producing properties in the future.

BROADWATER COUNTY.

The mining of precious metals in 1901 was distributed to the several districts of the county, but most extensively so throughout the

district south of Winston. Here the East Pacific and other properties have long been regular shippers. Gold and silver also came from the Hassel, Park, and Radersburg districts. The placers at Diamond City and in the vicinity of Townsend were worked in 1901.

CASCADE COUNTY.

The ores mined here were principally from the Neihart and Barker districts, being of the class known as silver-lead products. Owing to many of these being of low grade in values, it was impossible to work all the former producing properties throughout the county in 1901 on account of the customs smelter near Great Falls having been closed. Because of this the heavy falling off in the aggregate values is accounted for.

The smelting works belonging to the Boston and Montana Consolidated Copper and Silver Mining Company, near Great Falls, were in operation throughout the year on the large tonnage of ores received from the mines belonging to the company in the Butte district.

FERGUS COUNTY.

This county witnessed the most important advancement made in Montana during 1901 for the winning of gold. The application of the cyanide process to handle the low-grade deposits of gold ore in the Gilt Edge district attracted much capital, and the year was marked by the erection of new plants, extensive development, and a large output of gold commenced therefrom. This product amounted to a very considerable figure, the output of nearly 34,000 standard ounces of gold having nearly all been the result of the employment and adoption of the cyanide process to extract the values.

The leading mines employing the cyanide process in the Gilt Edge district during the year were the Gilt Edge, Kendall, Barnes-King Group, and Whisky Gulch. At all of these marked activity was to be noted, while other claims were brought out preparatory to opening for production.

FLATHEAD COUNTY.

The mining operations in Flathead County that had been carried on in 1900 were continued throughout the year. Some of the prospects in the Libby district gained an importance that promises to make them producing mines in the near future. The principal mine was the Snow Shoe, where the work that had been suspended for some time was taken up by a new management that effected the uncovering of large bodies of high-grade ore.

GRANITE COUNTY.

While this county ranks high as a producer of gold from its mines and mills, yet it is from the high-grade silver deposits at Philipsburg that the principal importance attaches. Here the Granite Bimetallic Mining Company worked its large mills throughout the year on ores carrying their values almost exclusively in silver. The placers of the county yielded a very handsome return in gold for the work prosecuted during the year.

JEFFERSON COUNTY.

Considerable activity was displayed at the Elkhorn mine because of the erection and equipment of reduction works to treat the low-grade ores remaining both in the old workings of the mine and in the large dumps outside. The other districts of the county show but little or no change from conditions of the previous year.

LEWIS AND CLARKE COUNTY.

This county, which has long been the greatest producer of gold in Montana, maintained its prestige throughout 1901. The operations of the large producers in the county was on about the same scale as in 1900. What is known as the Marysville district is entirely in this county, and contains the Bald Butte and Drum Lummon mines. The Belmont and Cruse properties in this district were idle most of the year. New cyanide plant works were erected at the Empire and Granite Butte mines to treat the accumulated tailings, while in the Empire mine itself a large sum of money was expended by Michigan capitalists to explore the ore zone tributary to its old works. A cyanide plant in Piegan Gulch worked over the tailings from the Gloster mill until the approach of freezing weather. A cyanide plant was also working on the tailings below the Jay Gould mine. The other districts of the county saw the work of former years continued during 1901, and the winning of an average production from each in consequence.

MADISON COUNTY.

From the operations in this county large gold and silver values were gained, thus giving it an importance in the amount of gold that was produced excelled by only two counties in the State.

At Pony work was prosecuted rapidly upon the Boss Tweed-Clipper group, recently purchased by Butte and other Eastern capitalists, who secured the 120-stamp mill that some two or three years ago had been erected at the Diamond Hill Mine, in Broadwater County. This was removed and set up at Pony. The other places from which gold was won were Alder Gulch, Red Bluff, and the Richmond Flat district.

PARK COUNTY.

In the Bear Gulch district considerable activity was manifested during the year, the Bear Gulch Company having worked its 20-stamp mill steadily throughout the year. Some gold also came from the placer district near Chico.

POWELL COUNTY.

The gold and silver produced in this county was from mines of the Garnet district, and from the many placers located in the county. This county was created by the Montana legislature during the session early in the year, and comprises nearly all of what was formerly the mining regions of Deer Lodge County. In these little or no changes of note occurred in 1901.

SILVERBOW COUNTY.

Mining in this county is confined to the district at Butte, and is the most important in the State. The large quantities of gold and silver originating in this county occurred as by-products from the reduction and treatment of the enormous tonnages of ores taken from the mines at this place. The companies mining extensively at Butte in 1901 were the Anaconda, Boston and Montana, Parrot, Colorado, Montana Ore Purchasing Company, and the Butte Reduction Works. The product of these mines was treated by the smelters at Anaconda, Great Falls, and Butte, Mont.

In the tables which follow the production is shown in its several phases, and is set forth in figures showing practically all the details in relation thereto. They have been accurately compiled after wide correspondence and careful investigation, and are, therefore, valuable to those concerned.

DEPOSITS AT THE UNITED STATES ASSAY OFFICE, HELENA, MONT., DURING THE
CALENDAR YEAR 1901.

County.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Commer- cial value.	
	<i>Standard ounces.</i>		<i>Standard ounces.</i>		
Beaverhead	453.603	\$8,439.11	44.91	\$24.45	\$8,463.56
Broadwater	1,159.253	21,567.44	160.29	86.32	21,653.76
Cascade	247.620	4,606.88	100.36	53.72	4,660.60
Custer	4.809	89.47	.38	.21	89.68
Choteau	83.179	1,547.51	40.67	21.10	1,568.61
Fergus	10,080.893	187,551.46	220.19	114.67	187,666.13
Flathead	1,385.875	25,783.72	206.77	109.64	25,893.36
Granite	494.529	9,200.50	48.35	26.04	9,226.54
Jefferson	1,803.978	33,562.37	180.75	97.37	33,659.74
Lewis and Clarke	28,329.809	527,066.00	11,788.23	6,402.11	533,468.11
Madison	15,366.018	285,879.20	4,757.65	2,561.56	288,440.76
Meagher	99.870	1,858.04	5.89	3.19	1,861.23
Missoula	3,166.432	58,910.31	161.42	87.05	58,997.36
Park	9,090.013	169,116.44	2,112.39	1,139.98	170,256.42
Powell	5,275.318	98,145.42	716.38	383.12	98,528.54
Ravalli	1,445.028	26,884.22	100.28	53.14	26,937.36
Silverbow	2,328.546	43,321.76	580.32	311.63	43,633.39
Total Montana	80,814.773	1,503,529.85	21,225.23	11,475.30	1,515,005.15
Alaska	491.338	9,141.16	56.63	29.96	9,171.12
Georgia	23.463	436.52	1.44	.79	437.31
Idaho	7,429.378	138,220.90	1,746.54	941.63	139,162.53
Oregon	105.734	1,967.14	29.37	16.55	1,983.69
Washington	1,652.845	30,750.57	485.24	256.64	31,007.21
Wyoming	15.046	279.92	1.38	.75	280.67
British Columbia	25,110.151	467,165.55	15,087.23	8,202.46	475,368.01
Northwest Territory	378.726	7,046.06	114.34	63.39	7,109.45
Jewelry	109.594	2,038.96	26.27	14.36	2,053.32
Redeposits	468.129	8,709.38	328.35	174.17	8,883.55
Total	35,784.404	665,756.16	17,876.79	9,700.70	675,456.86
Grand total	116,599.177	2,169,286.01	39,102.02	21,176.00	2,190,462.01

PRODUCTION OF GOLD AND SILVER IN MONTANA DURING THE CALENDAR YEAR 1901.

Summary, by counties.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Beaverhead	6,064.884	\$125,372.28	240,823.86	\$311,368.22	\$436,740.50
Broadwater	5,238.107	108,281.28	175,462.66	226,860.81	335,142.09
Cascade	1,422.857	29,413.06	250,294.41	323,612.97	353,026.03
Choteau	74.862	1,547.54	36.60	47.32	1,594.86
Custer	4.328	89.47	.34	.44	89.91
Fergus	33,618.681	694,959.81	8,746.10	11,308.09	706,267.90
Flathead	2,247.287	46,455.55	40,186.09	51,957.79	98,413.34
Granite	10,566.047	218,419.58	1,827,868.32	2,363,304.49	2,581,724.07
Jefferson	4,472.870	92,462.43	169,687.01	219,393.30	311,855.73
Lewis and Clarke	51,090.691	1,056,138.32	133,149.24	172,152.55	1,228,290.87
Madison	41,079.113	849,180.63	183,772.94	237,605.42	1,086,786.05
Meagher	89.883	1,858.05	240,005.30	310,309.88	312,167.93
Missonla	3,349.788	69,246.26	845.28	1,092.89	70,339.15
Park	9,433.012	194,997.66	2,994.16	3,871.24	198,868.90
Powell	7,837.787	162,021.43	81,694.74	105,625.53	267,646.96
Ravalli	1,300.526	26,884.25	90.26	116.70	27,000.95
Silverbow	47,132.745	974,320.31	9,638,071.42	12,461,344.86	13,435,665.17
Returns from custom smelters, mints, and assay offices im- possible to classify by coun- ties	7,307.986	151,069.48	1,186,816.46	1,534,469.76	1,685,539.24
Total	232,331.454	4,802,717.39	14,180,545.19	18,334,442.26	23,137,159.65

BULLION OF MONTANA PRODUCTION DEPOSITS AT THE UNITED STATES ASSAY OFFICE,
HELENA, MONT., DURING THE CALENDAR YEAR, 1901.

Origin.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Commer- cial value.	
	<i>Standard ounces.</i>		<i>Standard ounces.</i>		
Placer gold	18,187.557	\$338,372.69	2,431.97	\$1,307.99	\$339,680.68
Mill bullion	62,627.216	1,165,157.16	18,793.26	10,167.31	1,175,324.47
Total	80,814.773	1,503,529.85	21,225.23	11,475.30	1,515,005.15

BULLION OF MONTANA PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY
OFFICES DURING THE CALENDAR YEAR 1901.

Institution.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Standard ounces.</i>		<i>Standard ounces.</i>		
Mints:					
Denver	41.783	\$777.36	6.21	\$7.23	\$784.59
Philadelphia	7,150.058	133,024.33	3,547.93	4,128.50	137,152.83
San Francisco	57.314	1,066.31	3.14	3.65	1,069.96
Assay offices:					
Boise	7,615.041	141,675.18	780.75	908.51	142,583.69
Helena	80,814.773	1,503,529.85	21,225.23	24,698.45	1,528,228.30
New York	28,587.295	531,856.65	27,579.44	32,092.43	563,949.08
Seattle	5.818	108.24	.89	1.04	109.28
Total	124,272.082	2,312,037.92	53,143.59	61,839.81	2,373,877.73

PRODUCTION OF GOLD AND SILVER IN MONTANA (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1901.

Origin.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Placer bullion.....	25,285.602	\$522,699.78	2,730.78	\$3,530.70	\$526,230.48
Mill bullion	72,961.647	1,508,251.10	2,042,990.48	2,641,442.24	4,149,693.34
Cyanide mill bullion...	57,013.558	1,178,574.84	126,492.27	163,545.56	1,342,120.40
In copper ores.....	45,850.574	947,815.48	10,136,892.57	13,106,285.34	14,054,100.82
In lead ores	6,479.641	133,946.07	397,029.03	513,330.47	647,276.54
In dry ores and concentrates, classed as smelting ores.....	24,740.432	511,430.12	1,474,410.06	1,906,307.95	2,417,738.07
Total	232,331.454	4,802,717.39	14,180,545.19	18,334,442.26	23,137,159.65

ORIGIN, BY PERCENTAGES, OF THE PRODUCTION OF GOLD AND SILVER IN MONTANA DURING THE CALENDAR YEAR 1901.

Origin.	Gold.	Silver.
	<i>Per cent.</i>	<i>Per cent.</i>
Placer bullion	10.88	.03
Mill bullion	31.44	14.41
Cyanide mill bullion	24.54	.89
Copper ores	19.72	71.49
Lead ores	2.78	2.79
Dry ores	10.64	10.39
Total.....	100	100

PRODUCTION OF COPPER AND LEAD IN MONTANA DURING THE CALENDAR YEAR 1901.

Summary, by counties.	Copper.	Lead.
	<i>Fine pounds.</i>	<i>Fine pounds.</i>
Beaverhead.....	103,691	767,259
Broadwater.....		2,407,036
Cascade.....		852,288
Flathead.....		300,000
Granite	7,198	6,464
Jefferson	128,196	66,404
Lewis and Clarke.....	13,900	77,488
Madison	3,000	
Meagher		2,500,000
Silverbow.....	227,742,262	138,846
Custom smelter, in addition to the above; not possible to distribute by counties	33,256	4,389,107
Total.....	228,031,503	11,504,892

DISPOSITION OF GOLD AND SILVER OF MONTANA PRODUCTION DURING THE CALENDAR YEAR 1901.

Disposition.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Deposited at the United States mints and assay offices	111,844.874	\$2,312,037.92	47,829.24	\$61,839.81	\$2,373,877.73
Shipped to custom smelters and refineries by producers.....	120,486.580	2,490,679.47	14,132,715.95	18,272,602.45	20,763,281.92
Total	232,331.454	4,802,717.39	14,180,545.19	18,334,442.26	23,137,159.65

NEVADA.

By R. K. COLCORD,

Assayer in charge of the United States mint, Carson City, Nev.

Nevada's production of gold and silver for the calendar year 1901 was:

Gold	\$3, 099, 566
Silver (coining value)	2, 613, 826
Total production for the year 1901	5, 713, 392
Total production for the year 1900	3, 954, 878
Increase	1, 758, 514

The year 1901 in Nevada has been a period of marked progress and increased developments in a mining way. The bullion output for the year was 44 per cent greater than that of 1900 and 52 per cent greater than that of 1899. Tonapah, the newly discovered camp in Nye County, is responsible for the greater portion of this increase, though nearly every county in the State reports substantial gains.

STOREY COUNTY.

Storey County's output has more than doubled. The famous old Comstock has shaken herself free from the ennui with which she has been afflicted for some years, and with improved facilities and cheap electric power, together with a general feeling of confidence, she is again attracting the attention of mining men. At the Consolidated California-Virginia the hydraulic pump has lowered the water some 500 feet below the Sutro tunnel, thus enabling the company to resume stoping the narrow veins of high-grade ore which have been submerged for about fifteen years. This mine has during the past year yielded over three-quarters of a million dollars, principally from ores extracted from the 1,850 to the 2,150 foot levels; of this amount about three-fifths is gold. Several other of the old Comstock mining companies are preparing to resume work in the same manner on their lower levels by the adoption of electric elevators for the handling of the water.

NYE COUNTY.

In my report of last year mention was made of an entirely new discovery of very high-grade ore in the outcrop of a series of veins at a place in Nye County named Tonapah—post-office address, Butler—60 miles from the railroad and about the same distance from water for milling. The discoverers and locators were miners without means, and they not only went to work themselves, but adopted a system of leasing a hundred feet on the vein to any and all working miners who came. All of these leases were verbal, not a scratch of a pen being made in any case, and ran until December 31, 1901. Most of these

leases were granted in May and June, 1901, since which time—about eight months—the mines have produced \$800,000 in bullion, 25 per cent going to the owners and 75 per cent to the lessees. Over fifty openings have been made on the five separate ledges, and in nearly every instance good milling ore was found. The lowest estimate placed on the value of the ore extracted and on the dump is \$2,000,000. All of the bullion thus far produced came from ores shipped 60 miles by team, thence 350 miles by rail to the reduction works. These mines are now owned by a Philadelphia company, and active preparations are going on to bring water and erect a large reduction works at the mines. In the meantime extensive development work is being carried on. The greatest depth attained is 280 feet, where the ledge is 11 feet thick, all clean ore, averaging \$175 per ton. (In my tables of the estimate of the bullion production of the State only the actual bullion yield of the Tonapah ores is included. The \$2,000,000 contained in the ores extracted and awaiting reduction cut no figure in the bullion output for 1901.)

Aside from the Tonapah mines, Nye County has increased her yield over that of 1900 in both gold and silver, as have most of the real mining counties of the State. The building of the new railroad through the eastern and southern counties is causing an unusual activity among mining men. In all directions new properties are being prospected, and capitalists have their experts in the field seeking new discoveries or the purchase of old abandoned mines known to be valuable under improved conditions.

WASHOE COUNTY.

The yield of gold bullion from the Olinghouse district was about the same as that of 1900, and no important developments have been made.

The Wedekind mine, 3 miles north of the town of Reno, has been in litigation, and in consequence but little ore has been shipped, though a considerable quantity has been extracted. Judging from present indications, the ore bodies are extensive in depth and the ore continues rich. A 50-ton plant for reducing the ores on the ground is now in course of erection by the new management. Considerable work is being done in the Pea Vine district, and some very promising copper developments have been made in that locality.

WHITE PINE COUNTY.

The McKinley group of mines, at Ely, owned and operated by New York and Canton, Ohio, people, are likely to prove valuable properties.

The main working shaft has cut a 10-foot ledge of \$30 gold ore, and on one of the other locations large bodies of low-grade ore have been encountered. At the Chainman mine, owned and operated by substantially the same syndicate, the prospects are equally encouraging. The Rocco-Homestake Company has shipped during the year silver-lead ores to the amount of \$91,000.

LINCOLN COUNTY.

Lincoln County is becoming the center of a great boom, brought about by the surveying and grading for the two new railroads. Prob-

ably no other county, unless it be Nye, is so covered with prospectors rushing in to take advantage of the very best opportunities that may offer through the entire length of the county. The Delamar mine continues to hold its place as the chief gold producer of the State, and the April Fool, in the immediate vicinity, promises to become a rival in the near future. Reports from other sections of the county adjacent to the lines of the new railroads are to the effect that some new and important discoveries of gold and copper have already been made.

EUREKA AND LANDER COUNTIES.

The output of silver from these counties is about the same as in 1900. Lander shows a slight increase in gold. The Tenabo Mining Company, operating at Cortez, Eureka County, is the largest producer. Its ores are all shipped to Omaha for reduction.

ESMERALDA COUNTY.

The Pamlico and La Panta group of gold mines, in Hawthorne district, noted for their fabulous richness in the past, have recently passed into the hands of a wealthy syndicate of New York City and Buffalo men.

This management will immediately cause the erection of a 40-stamp mill at the mines, with a 15-mile pipe line to conduct water to the plant. It is one of the most promising enterprises in the State.

These mines were worked or, rather, gouged ten or twelve years ago for the rich pockets and streaks, leaving thousands of tons of good milling ore on the dumps and other thousands of tons in sight in the mines that could not be handled at a profit then, as there was no water within 12 miles, even for domestic use, and the cost of transporting and milling the ore was very heavy. The Pamlico mine is noted for having produced 6 tons of ore which yielded \$55,000 in gold. The bullion from these mines goes over 0.850 fine in gold. For the past thirty-five years Pine Grove district has been a steady producer and is keeping up its record. The bullion from this section is worth over \$19 per ounce.

ELKO COUNTY.

The chief gold producer of this county is the Dexter-Tuscarora gold mines at Tuscarora. This old mine, which remained idle for some years, was reopened about three years ago and has been a constant producer ever since. The company's bullion shipments for 1901 amounted to \$175,000. There are many small producers at different localities, and some placers, worked principally by Chinamen. The Monarch, at Spruce, is developing into quite an important silver-lead mine.

LYON COUNTY.

The Silver City mines are the oldest and steadiest gold producers of Lyon County. There has been but little variation in the annual output from this camp for the past twenty years, though during the past year the Lager Beer mine has increased its yield, having encountered larger bodies of ore of improved grade. At Yerington a 50-ton plant for smelting copper ores has been installed and a great deal of development work has been done on the several mines in that vicinity, but as yet only a few small shipments of copper matte have been made.

HUMBOLDT COUNTY.

There has been no special activity in gold mining in Humboldt County during the past year and nothing of importance has been reported. The Glasgow and Western copper mines, with smelter, located at Golconda, upon which work was suspended early in the year, owing to an insufficiency of water, are again in active operation. This property is owned by a Scotch syndicate. The difficulty heretofore has been a lack of proper fluxing ores. I understand this has been overcome and that now the owners are very sanguine of final success.

ORMSBY, CHURCHILL, AND DOUGLAS COUNTIES.

Lastly, come Ormsby, yielding \$70,949, mostly from tailings; Churchill with \$5,000, and Douglas with \$582 to their credit.

This completes the list of counties, making every county in the State a producer of gold and silver bullion in 1901.

COPPER.

The purchase and development of the copper properties, reported last year, in the counties of Esmeralda and Lyon have not thus far proven as successful as was expected. One of the companies suspended operations early in the year, and two others are working only in a small way at their mines. These smelters are idle presumably on account of the low price of the metal. Considerable activity, however, is now being manifested in the Glasgow Company, operating in Humboldt County, and also by the same company in White Pine County.

LEAD.

The parties operating silver-lead mines have, as a rule, reported the silver only. Therefore any estimate of the lead product would be a guess. Nearly all of the silver-lead ores are taken from the mines of Eureka, White Pine, Elko, and Lander counties, and are shipped to Salt Lake, Denver, and Omaha for reduction.

The following table of comparison of the total production of gold and silver of the State for the years 1899, 1900, and 1901 will be of interest as showing the annual increase:

Metal.	1899.	1900.	1901.
Gold.....	\$2,498,910	\$2,023,803	\$3,099,566
Silver (coining value).....	1,241,880	1,931,075	2,613,826
Total	3,740,790	3,954,878	5,713,392

BULLION OF NEVADA PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1901.

Institution.	Gold.		Silver.	
	Weight.	Value.	Weight.	Coining value.
	<i>Standard ounces.</i>		<i>Standard ounces.</i>	
Mints:				
Denver.....	8.705	\$161.98	2.34	\$2.72
San Francisco	4,169.979	77,581.00	2,310.47	2,688.46
Assay office, New York	34,089.544	634,224.07	39,942.15	46,476.69
Total.....	38,268.228	711,967.05	42,254.96	49,167.87
To which add returns from custom smelters and refineries.....	128,333.442	2,387,598.92	2,204,071.94	2,564,658.11
Grand total	166,601.670	3,099,565.97	2,246,326.90	2,613,825.98

PRODUCTION OF GOLD AND SILVER IN NEVADA DURING THE CALENDAR YEAR 1901.

County.	Gold.	Silver.	Total value.
	Value.	Coining value.	
Churchill.....	\$2,000	\$3,000	\$5,000
Douglas	576	6	582
Elko.....	259,700	130,526	390,226
Esmeralda.....	112,504	45,503	158,007
Eureka.....	95,456	448,948	544,404
Humboldt.....	74,930	77,118	152,048
Lander.....	90,212	135,207	225,419
Lincoln.....	1,064,361	360,611	1,424,972
Lyon.....	153,413	101,766	255,179
Nye.....	423,540	578,780	1,002,320
Ormsby.....	20,012	50,937	70,949
Storey.....	526,992	480,716	1,007,708
Washoe.....	105,931	99,923	205,854
White Pine.....	169,939	100,785	270,724
Total	3,099,566	2,613,826	5,713,392

SOURCE OF PRODUCTION.

Source.	Gold.		Silver.	
	Weight.	Value.	Weight.	Coining value.
	<i>Fine ounces.</i>		<i>Fine ounces.</i>	
Placer.....	1,620.900	\$33,507		
Quartz	148,320.603	3,066,059	1,619.443	\$2,093,826
Silver-lead ores			402.188	520,000
Total.....	149,941.503	3,099,566	2,021.631	2,613,826

THE COMSTOCK LODGE.

By ALFRED DOTEN, *Virginia City, Nev.*

During the past year the resumption or increase of mining operations in the old Comstock Lode has not been as speedy or decisive as was anticipated, although considerable progress was made. Nearly all of the mining companies along the lode have discarded and disposed of their ponderous old steam machinery plants, some costing over a million dollars, shipping it away to other localities, but principally to the junk pile in San Francisco. Nearly all have adopted the electric power in their hoists and general workings, yet none of them, except one, have

as yet applied it to pumping out the long submerged lower levels below the Sutro Tunnel. In fact, it would seem that all are awaiting the movements and success of the Consolidated California and Virginia Mining Company in that respect, that being the leading and chief producing mine.

When that company commenced unwatering their lower levels, over two years ago, a powerful and effective hydraulic pump was brought into use, the water power being supplied by the Virginia and Gold Hill Water Company from the main Sierra Nevada range—a distance of 23 miles. This pump was placed at the 1,750-foot level or station of their C. & C. or main working shaft, 13 feet above the submerging water surface and 26 feet below the Sutro Tunnel intersection, gradually lowering the water as required and sending it out through the tunnel to Carson River. Moreover, being the only pump working, it had to do drainage for the other mines adjoining along the lode. The Consolidated California and Virginia Company has taken out over a million dollars by means of this pump, paying three monthly dividends, from the formerly submerged ore deposits.

NEW ELECTRIC MACHINERY.

All this has been done using the old steam hoisting machinery, but the new electric plant, conveniently placed, with its 200-horsepower variable-speed motor on balanced electric hoist, will soon be brought into effective use, superseding the obsolete, cumbrous old machinery and sending it to the junk pile. In connection with this new electric machinery, three powerful Reidler electric pumps or elevators are being installed at the 2,150-foot level or station, to drain the water down to the 2,500-foot level or bottom of the shaft. These pumps are from Chicago, and, without the operating machinery, weigh 260,000 pounds. Some idea of the dimensions of the pumps and machinery plant required for operating them may be found from the size of the station cut out for the installation, which is 110 feet in length by 30 feet wide and 25 feet high.

When these pumps are in full, successful working condition, other companies along the lode propose also getting in electric pumps and going still deeper, eventually reaching 3,300 feet in depth, or deepest workings of the Comstock, where further work in that direction was suspended sixteen years ago. All this will be very materially encouraged and precipitated in case the Consolidated California and Virginia should happen to strike one of its old-time bonanzas in its deeper explorations.

THE GOLD HILL SECTION.

The southeastern portion of the Comstock Lode, extending down through Gold Hill to Silver City, has contributed largely to the general bullion production during the year, with a good prospect for improved continuance. The Yellow Jacket, Belcher, and other old leading mines have been fitted with electric hoisting machinery and are well prepared for any great ore emergency that may be encountered.

The Yellow Jacket especially has been changed in that respect, the new shaft, 3,000 feet in vertical depth—the deepest in that section of the Comstock—being totally abandoned as useless. The surface machinery for this deep sinking, including the pump, cost over

\$1,000,000, but it has all been done away with and removed, electric power being substituted at the original works in the town of Gold Hill.

The future workings of the Crown Point mine will be through the Belcher or the Yellow Jacket mines.

EVOLUTION OF DEEP MINING.

It is a matter of history that the original engineers of the Comstock were pioneers in the design of deep-mine hoisting machinery, and upon the old lode to-day may be traced remnants of the product of their brains, from the earliest V friction drums with hemp rope to the massive direct-acting hoist of the present day. The machinery on the first line of shafts, near the outcrop or apex of the lode, was of the most primitive character. The second line, which cut the vein on its eastward incline at about 1,200 feet, was equipped with geared hoists, single engines, and flat-rope reels. The third line or east shafts were designed to intersect the vein at a depth of about 3,000 feet and the best class of first-motion hoists were installed.

Of these powerful and ponderous hoists but few remain to remind one of the giant powers that were. Among the number may be mentioned the 26 by 72 inch double engine, which raised nearly \$6,000,000 in one month from the 1,650-foot level of the C. & C. shaft. The 32 by 96 inch first-motion hoist, which was used at the Union shaft, is now doing good service on the Parrott mine, at Butte, Mont. With this class of machinery a rope speed of 3,500 feet per minute with a load of 10 tons was not an unusual occurrence. The cost of operation was, however, enormous, and as the resources diminished they were gradually abandoned, and all will soon give way to the régime of electricity.

SPECIMEN OLD COMSTOCK PUMPING PLANTS.

The pump of the Union shaft works at the north end of the lode. Still there was what is generally known as a direct-acting double line of Cornish pumps with 10 feet stroke, driven by a compound engine within inclined cylinders and inverted walking beam. The initial cylinder is 64 inches in diameter, with 6 feet 9 inches stroke, and the low-pressure cylinder is 100 inches in diameter, with 8 feet 6 inches stroke. The fly wheel is 36 feet in diameter and weighs 208,700 pounds. The wrought-iron walking beam is 22 feet long and weighs 238,610 pounds.

The pump rod is 18 by 18 inch Oregon pine, 2,618 feet in length, and its total weight in motion was 1,620,500 pounds; capacity, about 750 gallons per minute to a height of 1,180 feet. This pump was started in 1880 and did good work, but was very expensive in its operation. The whole plant complete cost over \$1,000,000.

The Yellow Jacket mine, Gold Hill, had a double line of 14-inch pumps with 10-foot stroke, driven by a horizontal compound engine with double box castings, 64 feet long for the bedplate. The initial cylinder was 31 inches in diameter, with 12-foot stroke, and the low pressure 62 inches diameter, with 12-foot stroke. The pump rod was 3,055 feet long and weighed, when in motion, 1,510,400 pounds. Its greatest capacity was raising 750 gallons of water 1,516 feet per minute.

THE CESSATION OF DEEP MINING.

The pumps at the combination shaft of the Chollar-Norcross-Savage mining companies, 3,260 feet deep, consisted of a 14-inch Cornish pump and a hydraulic pumping plant, the first on the Comstock. This was operated by water power furnished by the Virginia and Gold Hill Water Company and discharged into the Sutro Tunnel. About the time deepest mining was discontinued and the mines allowed to fill and become permanently submerged, which was in October, 1886, this hydraulic system was lifting 2,138 gallons per minute a distance of 1,620 feet to the tunnel level. The total cost of this pumping arrangement was over \$1,000,000.

At the date mentioned that hydraulic pump had all the water it could possibly handle. The Hale & Norcross 3,200-foot level had come to a connection with the combination shaft, also the Savage and the Chollar was drifting south from the shaft on the same level. But the Chollar, drifting toward the already submerged mines of Gold Hill, encountered a constant increase of water—more than the hydraulic pump could manage. The water gained upon the shaft men, and the result was that, as no increase of pump power was feasible, all had to submit to the inevitable and allow the hot water to have full submerging sway henceforth.

The Combination shaft was the deepest vertical point attained in Comstock workings, and notwithstanding the partial drainage from the Consolidated California, and Virginia pump, the water still stands 1,200 feet deep in this shaft.

INTERESTING TABULAR STATEMENT.

The following very comprehensive statement of regular assessments levied and dividends declared on the mines of the Comstock lode from the commencement, forty years ago, will be read with interest, especially by all who are still paying those assessments or receiving any dividends. It shows which have been the most prosperous mines, also some that were all assessments and no dividends—like the Bullion mine, right in the heart of the great lode, which has never produced a pound of bullion for all its millions in assessments. But it also shows the great dividend payers, and very conclusively shows that the old Comstock considerably more than paid its way, putting many millions of luxurious profits into the pockets of those who confidently invested in it. It also shows the regular order of succession of the various mines of the Comstock main range, commencing at the north end and following southward down through Gold Hill to Silver City, a distance of 3 miles. Only three dividends were paid during the year, amounting to \$64,800, from the Consolidated California and Virginia mine, but the chances are still good for more and larger ones. Small assessments continue to be regularly levied, as usual, all along the line.

ASSESSMENTS AND DIVIDENDS.

Name of mine.	Number of feet.	Total amount of assessments.	Total amount of dividends.
Utah Consolidated	1,500	\$525,000	.....
Sierra Nevada	4,400	6,060,910	\$102,500
Union Consolidated	1,000	2,725,000	.....
Ophir	675	4,818,748	1,592,800
Mexican	600	2,375,390	.....
Consolidated California and Virginia	1,310	3,443,100	84,234,800
Best & Belcher	540	2,736,833	.....
Gould & Curry	612	4,780,250	3,837,600
Savage	771	7,382,600	4,460,000
Hale & Norcross	400	5,773,480	1,850,000
Chollar	700	2,142,800	750,000
Potosi	700	2,259,120	.....
Bullion	943	3,142,000	.....
Alpha	306	328,650	.....
Exchequer	400	1,023,000	.....
Imperial Consolidated	468	2,291,000	500,000
Challenge Consolidated, including Bowers and other small Gold Hill mines adjoining	150	455,000	4,800,000
Confidence	130	563,596	204,490
Yellow Jacket	1,200	5,866,000	2,196,000
Kentuck	90	128,450	1,350,000
Crown Point	641	3,030,060	11,903,000
Belcher	1,040	3,658,600	15,397,200
Segregated Belcher	1,324	386,000	.....
Overman	1,200	57,500	.....
Caledonia	2,188	3,255,000	.....
Justice	2,100	3,705,000	.....
Alta	600	3,712,510	.....
Silver Hill	1,200	2,220,200	.....
Total		78,845,737	133,178,390

Excess of dividends over assessments, \$54,332,653.

THE MILL TAILINGS INDUSTRY.

During the past year there was a slight falling off in the amount of mill tailings worked and bullion produced from that source. The Eureka cyanide plant on Carson River, hitherto the most complete and extensive in this section, had to reduce by reason of having worked out most of its immediately available deposits of tailings, and its proprietors transferred their principal operations to Silver City and Six-mile Canyon. Others diminished their production a little from local causes, to be more abundantly heard from later on.

The combined workings of all the cyanide plants of Carson River, Silver City, Six-mile Canyon, etc., give an aggregate tailings yield for 1901 of \$284,800, which, added to the yield by calendar years from commencement, makes the account stand as follows:

Period.	Tons.	Gross yield or value.
To and including 1900	3,078,100	\$17,763,863.16
For the year 1901	108,400	284,800.00
Total	3,186,500	18,048,663.16

THE CHIEF CYANIDE PLANT.

Operations for the present year will be very considerably extended. There will not only be more and better cyanide plants, but greatest of all will be the immense Butters plant, in Six-mile Canyon. This is nearly completed, costing \$250,000, with tank capacity surpassing

all others combined. It has an old field or deposit of 300,000 tons of tailings to start in on, with plenty more in view. There are 800,000 tons held in acres of reserve at the mouth of the canyon near by. It looks as though this big plant alone might solve and clean up the entire old-time tailings problem in a very brief space of time.

But another proposition connected is this: The Butturs company has already got hold of low-grade mining ground and old mining dumps in its vicinity which will be utilized by getting small outside mills to crush the ore on contract and pipe the whole result direct from the batteries to the big cyanide plant itself for treatment. The plant is very favorably situated down in the canyon for their working with the greatest possible facility and profit. But it will be many years before a dozen Butturs plants will reclaim and rescue the \$60,000,000 in the early Comstock mill tailings known to have been lost in the Carson River.

COMSTOCK BULLION RECORD.

The following tabular statement is reproduced as being the most comprehensive summary of the bullion product of the Comstock lode ever published. It is very interesting, showing the gold and silver yield by calendar years from the very commencement and following its grand advance into hundreds of millions in production. Also its degrees of adversity; when the rich bonanzas weakened and but little ore being found at the greatest depth, 3,300 feet, further deep mining was suspended and the lower levels allowed to fill up with water to the depth of over 1,500 feet, or nearly to the Sutro Tunnel level, remaining thus submerged ever since.

This statement, originally prepared and published in 1887 at considerable expense, under Government auspices and direction, has been added to occasionally since and is now again presented, carefully revised and brought squarely up to date. It is responsibly compiled from the most correct and authentic sources possible to be found. It has stood the test of time and never been disputed, forming the only complete, legitimate, and substantially correct statement of the precious-metal yield of the Comstock lode:

TOTAL GOLD AND SILVER PRODUCTION OF THE COMSTOCK LODE FROM DISCOVERY AND COMMENCEMENT, BY CALENDAR YEARS, TO DATE.

Years.	Ore (tons).	Gold.	Silver.	Total.
1859		\$30,000.00	.....	\$30,000.00
1860	10,000	550,000.00	\$200,000.00	750,000.00
1861	140,000	2,500,000.00	1,000,000.00	3,500,000.00
1862	250,000	4,650,000.00	2,350,000.00	7,000,000.00
1863	450,000	4,940,000.00	7,460,000.00	12,400,000.00
1864	680,450	6,400,000.00	9,600,000.00	16,000,000.00
1865	430,745	6,133,488.00	9,700,232.00	15,833,720.00
1866	640,282	5,963,158.00	8,944,737.00	14,907,895.00
1867	462,176	5,495,443.20	8,243,164.80	13,738,608.00
1868	300,560	3,391,907.60	5,087,861.40	8,479,769.00
1869	279,584	2,962,231.20	4,443,346.80	7,405,578.00
1870	238,967	3,481,730.16	5,222,595.24	8,704,325.40
1871	409,718	4,099,811.46	6,149,717.19	10,249,528.65
1872	384,668	4,894,559.86	7,341,839.79	12,236,399.65
1873	448,301	8,668,793.40	13,003,187.13	21,671,980.53
1874	526,743	8,990,714.06	13,486,071.09	22,476,785.15
1875	546,425	10,330,208.62	15,495,312.92	25,825,521.54
1876	598,818	12,647,464.08	18,971,196.12	31,618,660.20
1877	562,519	14,520,614.68	21,780,922.02	36,301,536.70
1878	272,909	7,864,557.64	11,796,836.47	19,661,394.11
1879	178,276	2,801,394.33	4,202,091.49	7,003,485.82
1880	172,399	2,051,606.00	3,077,409.00	5,129,015.00

TOTAL GOLD AND SILVER PRODUCTION OF THE COMSTOCK LODE FROM DISCOVERY AND COMMENCEMENT, BY CALENDAR YEARS, TO DATE—Continued.

Years.	Ore (tons).	Gold.	Silver.	Total.
1881	76,049	\$430,248.00	\$645,372.00	\$1,075,620.00
1882	90,181	697,385.60	1,046,078.40	1,743,464.00
1883	125,914	802,539.54	1,203,809.29	2,006,348.83
1884	188,369	1,261,313.60	1,577,438.40	2,838,752.00
1885	226,147	1,729,531.25	1,415,071.04	3,144,602.29
1886	238,780	2,054,920.15	1,681,298.31	3,736,218.46
1887	223,682	2,481,176.85	2,030,053.78	4,511,230.63
1888	271,152	3,169,209.07	4,458,058.66	7,627,267.73
1889	286,144	2,590,973.32	3,358,949.95	5,949,923.27
1890	286,075	1,992,349.03	2,988,523.56	4,980,872.59
1891	188,647	1,380,857.02	2,071,285.53	3,452,142.55
1892	133,678	1,043,158.86	1,430,088.77	2,473,247.63
1893	109,780	1,123,262.54	748,841.70	1,872,104.24
1894	97,049	768,880.63	512,587.09	1,281,467.72
1895	63,558	548,873.68	365,915.79	914,789.47
1896	39,240	340,253.36	226,835.57	567,088.93
1897	17,850	223,808.63	149,205.76	373,014.39
1898	10,766	123,023.89	82,015.92	205,039.81
1899	6,780	103,006.74	68,671.16	171,677.90
1900	35,300	381,423.56	319,441.70	700,865.26
1901	56,577	746,477.00	521,032.00	1,267,509.00
Total	10,755,258	147,360,354.61	204,157,094.84	351,517,449.45
Total mill tailings added				18,048,663.16
Grand total				369,566,112.61

SUPPLEMENTAL AND EXPLANATORY.

As will be seen by the table, the most prosperous year was 1877, when the Comstock yield was over \$36,000,000, and the poorest year (except the few weeks or months of commencement in 1859) was in 1899—only \$171,678. And right here a word to those who ignorantly assert that our silver State, Nevada, is turning to gold. Silver has very largely predominated in the product of the Comstock, to the extent of \$150,000,000; Eureka, White Pine, Austin, and Pioche were decidedly silver camps, and now comes in Tonopah with a heavy yield of three-fourths or more silver.

Aurora produced \$19,000,000 of gold and died to nothing years ago; Delamar was a pretty good little gold camp and is trying to regain its former prestige in that respect; so, also, with unfortunate Silver Peak.

It is a common whining expression among some people that if silver was only up to par, \$1.2929 per ounce, there would be a perfect millenium of prosperity; yet Nevada's silver mines are her strong suit, and it is better to take the situation as it is and not as it might be.

Silver is produced for about half what it used to be, and all that is needed is a few more camps like Tonopah—nearly all silver—to make Nevada the richest bullion-producing State in the Union. Tonopah is laboring under the most abject disadvantages in transportation, ore reduction, lack of water, and other necessities; but many poor men have made fortunes from her silver mines, and it is only a matter of time when she will take the lead of all except the old Comstock.

The annual product of the Comstock got below the million mark in 1895, and its lowest production was in 1899, being \$171,678; but the last two years it has been getting up to and above the million mark again. The recorded amount of Comstock bullion to date is nearly \$370,000,000, but there has always been a great tendency among uninformed individuals to greatly overrate and exaggerate the true bullion yield, some placing it as high as \$800,000,000 or even more and few less than \$600,000,000; but facts are stubborn things to get over.

Yet it is well understood among all oldtimers and those most familiar with the early management and manipulations of the Comstock that in the good old flush times and bonanza days the affairs of the lively mining companies were conducted loosely in some respects. Sundry parties on the inside with the mining officials got hold of some extremely lucrative ore-working contracts and leases of choice ground at nominal rates—silent partners, etc.—from which millions were realized. No record of those sly transactions were to be found, but it is safe to say that over \$100,000,000 got away in similar surreptitious leakages, making the total production come up to \$500,000,000.

THE SUTRO TUNNEL.

During the past year work in the lateral branches of the Sutro tunnel, in the Comstock lode, was confined principally to low-grade ore explorations. The south branch ran through a large body of ore, giving good assays, claimed by the Culver Consolidated Mining Company. It is expected that arrangements will be made with the Tunnel Company for working this very promising deposit. The drains, tracks, and timbering of the tunnel have been put into excellent physical condition in anticipation of important extension and development work projected for the near future. The usual 7,000,000 gallons of water daily from the pumping operations of the Consolidated California and Virginia Mining Company continues flowing out through the tunnel drains to Carson River.

SILVER CITY EXTENSION.

A committee was appointed at the last annual meeting of the Tunnel Company to examine into the feasibility of proposed extensions, including the running of the main tunnel farther westward under and through Mount Davidson, about 3 miles, to cut promising ledges known to exist on the west side of the mountain; also the extension southwesterly from the Alta shaft 3,000 feet to drain the American Flat district, and, lastly, the extension of the main south branch of the tunnel southeasterly about 8,000 feet to drain the Silver City section of the Comstock.

After thoroughly canvassing the situation the committee found that the Silver City extension was the easiest constructed, the cheapest to build, and the most promising of quick returns; therefore they advised strongly the taking up of that proposition at once. A company known as the Gold Canyon Tunnel Extension Company has therefore been organized, with plenty of capital to carry the scheme through to success, and contracts have been submitted to the numerous mine owners and companies of Silver City district for their signatures. Nearly all have signed already, and the rest will do so shortly.

This being the southern terminus of the Comstock, the lode is separated into many small ledges, rich in gold, only a few of the principal branches carrying silver. Handicapped by strong bodies of water near the surface, precluding mining deeper than 200 feet in most cases, without powerful and expensive pumping machinery, still the known production has been \$25,000,000 or more. This extension of the Sutro tunnel will drain the mines to a depth of 800 feet, or 600 feet below the present water level, the company receiving a royalty of 10 per cent from the ore or bullion product for the drainage.

During the last thirty years vastly more money has been spent by the different companies for pumping than will be the cost of this drainage tunnel therefore the great importance and success of the enterprise will be easily understood and appreciated.

THE SUTRO TUNNEL MILL.

The fine 10-stamp mill at the mouth of the tunnel, the machinery of which is from the Union Iron Works, San Francisco, has been in continuous operation during the year entirely on ore from the old tunnel dump, being simply low-grade waste from running the tunnel branches in the Comstock lode, worth only about \$3 per ton. The concentration capacity of the mill has been increased, and it is now capable of handling 60 tons in each run of twenty-four hours. The water power costs nothing, the flow from the tunnel being amply sufficient to drive many more stamps, and every convenience is given for the most economical handling of the ore. A cyanide plant is also projected and will doubtless soon be made available. Water power is a prime factor in cheap ore reduction, and here we have it with unvariable supply the whole year round.

A NEW BIG DRILLING PROJECT.

A new method of prospecting for the precious metals at a great depth more speedily than by the sinking of great shafts was adopted several months ago by some of the middle Comstock mining companies.

This is done by means of a great hollow drill, boring a hole 5 inches in diameter from the surface down into the east or Brunswick wall of the lode, artesian style. In the working of the Chollar and Potosi mines a strong body of low-grade ore was demonstrated to exist away eastward, on or about the 700-foot level, and the controlling powers of those companies resolved to adopt this new mining weapon known as the Davis Calyx drill, which would penetrate the downward continuation of the ore body at a vertical depth of about 900 feet. Moreover, still deeper boring was taken into consideration, even to the submerged lower levels, which would cost so immensely to unwater. This drill would do the thing satisfactorily and speedily at a trifling cost. The drill was started and was sent down at a very lively rate, without any casing, until it reached a depth of 460 feet, when it became struck, or "fitchered"—to use a common Cornish mining term. Casting had to be procured and driven down to the rescue of the drill, taking over a month. In 40 feet farther it got fitchered again, and subsequently again, each time fresh casing having to be driven down inside, and the size of the drill further reduced, until finally, at the depth of 850 feet, the drill hole was considered too small for practical use and further drilling had to be discontinued—a dead failure.

As soon as the requisite casing could be procured a new hole was started 15 feet farther south—this time being a 7-inch hole. Having the advantage of previous experience, this drill hole has gone uninterruptedly downward over 600 feet, and may eventually accomplish all that its projectors claim for it. Most certainly it is something new in mining after ore at great depths, especially below the water level, and its results are regarded with great interest by all practical mining men.

PRESENT AND FUTURE OUTLOOK.

Notwithstanding the impending elements holding back and interfering with the general advancement, the old Comstock has gone ahead quite perceptibly during the past year, as shown by the much-increased annual bullion production—considerably above the million mark for the first time in six years—and also three dividends paid. Between 300 and 400 men are employed in or connected with the mines, the immense Butts cyanide plant employing 150 men in its construction, and it will keep from 50 to 100 men permanently employed in its extended and enterprising workings for many years to come.

The Silver City section must experience a revival of its lucrative mining operations from the extension of the Sutro Tunnel, giving a much deeper basis of drainage and better ore-extraction facilities.

During the coming year the old Comstock will advance in prosperity and her bullion product arise easily above the two-million mark.

TONOPAH, THE RICH NEW MINING DISTRICT OF NEVADA.

By ALFRED DOTEN.

It was in April, 1900, that James L. Butler discovered the series of rich silver and gold ledges of Tonopah. He had been a prominent resident of Belmont, the county seat of Nye County—even occupying the position of district attorney for a couple of terms—but being a Californian by birth, about 45 years of age, a great natural observer, and considerable of a geologist, he was naturally interested in the mining and prospecting developments of Nevada.

He started out from Belmont with a partner, suitably equipped with the necessary provisions, and camping outfit packed on a small band of burros, or donkeys, to prospect the dry desert country to the southwest, on the way to Klondike, a mining camp about 50 miles distant. He had often expressed a desire to prospect in the vicinity of the now famous Tonopah district, as he had noticed white porphyry and other indications along the mountain sides, which his good mining judgment told him was very favorable for mineral deposits.

DISCOVERY AND LOCATION.

He found the ledges and took samples from them; yet the croppings were so large that it was hard to imagine them to be very rich; moreover, the peculiar character of the ore itself did not give a favorable impression. Subsequent assays, however, showed high values in both silver and gold, some of the ore being sent to Austin and elsewhere to be assayed and its true valuable character ascertained. His partner took but little interest in the matter and they subsequently separated, and it was not until months later on that Butler himself concluded to revisit the locality. Moreover, it is a known fact that several parties had seen and examined these same croppings at various times and had not considered them of sufficient value to locate them.

Accordingly, on the 27th of August, 1900, finally induced by the good assays obtained, Butler drove out from Belmont to the ledges on a buckboard and proceeded to locate them all in due form, using his own as well as the names of friends in making the locations.

Being a family man, he took his wife along, and she located and named the Mizpah ledge, which proved to be the chief bullion producer of them all (the eight locations made being the Mizpah, Buckboard, Burro, Valley View, Desert Queen, Silver Top, Red Plume, and Sand Grass, these claims now forming the regular Tonopah group).

LEASING SYSTEM ADOPTED.

Mr. Butler gave an interest in the new discovery to T. L. Oddie and W. Brougher, who were operating some mining property in Belmont, for the assistance they afforded him in starting in on his new development, and, as the requisite "holding" work had to be performed immediately, he shortly inaugurated the system of leasing his ground out in small sections to miners, which proved the true value of the mines in a remarkably short space of time. The leases embraced 100 feet or less each along the ledge, and inside of a year he had given over 125 leases to prospectors and miners who crowded into the new camp as soon as the news of its remarkable richness became known to the outside world. The leasers, paying 25 per cent royalty to the Tonopah Company, extracted a very large amount of ore up to January 1, 1902, when their leases all terminated.

Up to that time most of the leasers had been chloriding for rich pockets of ore close to the surface and did not care or lacked the means to sink to much depth. Before the expiration of the leases men were crowded into the numerous workings as thickly as ventilation would allow, and it is safe to say that during that time fully 600 miners were at work. The result was that great dumps of ore were piled up, which contained close upon 20,000 tons, of the assay value of over \$100 per ton. As a matter of fact, the leasers worked but a small portion of their ground, as, having such a limited time in which to work, they confined their efforts to the richest chutes of ore that they uncovered. There were only two that reached the 200-foot level, but they did very little stoping below the 100 and 150 foot levels.

THE TONOPAH MINING CAMP.

Meanwhile a very lively and vigorous town of tents, boards, and all sorts of shanties sprang into existence on the favorable slope of barren waste near the mines, which the postmaster named "Butler," out of compliment to the discoverer, and it was recognized as its official name by the Post-Office Department at Washington, but no one else adopted or recognized the name and the place is naturally designated "Tonopah" popularly, going by no other name throughout the country.

Tonopah is an Indian word signifying "water brush," the district being so named by the discoverer himself. The lack of adequate transportation facilities interfered very much in the procuring of lumber and building material, but the growth of the town has been very rapid nevertheless, containing at the present time many fine buildings and a population of 3,000 people.

Tonopah supports 32 saloons, 6 faro games, 2 dance houses, 2 weekly newspapers, a public school, 2 daily stage lines, 2 churches, and other elements of internal prosperity. It is a very orderly community, and there has been but one stage robbery thus far.

Being a dry desert country, there are no wells or springs, and water for domestic use or any other purpose has to be hauled in barrels from miles away.

It is about 200 miles from Virginia City and 60 miles from the Carson and Colorado Railroad. The ore from the mines has been and is being hauled to Sodaville and Candelaria on that road by teams.

This 60 miles of road is very heavy and dusty, and it takes the teams nine or ten days to make the round trip; hence the daily output has been much limited. As it is, there are approximately 500 horses and mules kept on the road all the time, hauling ore out and supplies, lumber, machinery, etc., into camp. The teamsters have to haul all the feed for their teams from the railroad.

THE PHILADELPHIA PROPRIETORS.

About the 1st of June, 1901, Butler effected a sale in San Francisco of the Tonopah group of mines to a Philadelphia syndicate for \$336,000, and with the sale went the 25 per cent royalty from the leasers, whose time did not expire until the end of the year, under verbal contract, for no other contract went between them and Butler—not the scratch of a pen—yet in every case these contracts were honorably stipulated and carried out between himself and the new proprietorship.

And thus it was that the Philadelphia syndicate had got all their money back from the royalty when the property fell into their possession. Few cases like Tonopah exist in this world, where the original locator makes good money out of it, the leasers all make good money out of it, and the purchasing syndicate also make good money out of it and continue making money, with a liberal margin for untold future wealth. Everybody makes money out of Tonopah—can not lose.

Last January the Philadelphia syndicate, taking possession, started in to do regular, systematic development work, as prior to that time every leaser was working for himself, with no regard for the future development of the mines. The new company, the Tonopah Mining Company of Nevada, commenced the sinking of several working shafts, crosscutting and running levels on the Mizpah ledge, which present developments have shown to be the richest. They are blocking out an immense quantity of high-grade ore, and the deepest workings show the ledge to be improving in size and richness.

TOTAL PRODUCTION OF THE TONOPAH MINES.

Notwithstanding the difficulties limiting the marketing of the ore, there was shipped to the smelters during the year 1901, 2,534 tons of ore, which assayed 246.06 ounces in silver and \$79.73 in gold, making a total silver value, figuring silver at 60 cents per ounce, of \$374,109.62, and the gold at \$79.73 per ton would make a total gold value of \$202,035.82, or a total output for the year 1901 of \$576,145.44.

From January 1, 1902, to July 1, 1902, there was shipped 4,508 tons of the average assay value of 233.37 ounces in silver and \$58.37 in gold to the ton, which, figured at 60 cents per ounce, would make a total silver value of \$631,120, and at \$58.37 in gold would make a total gold value of \$263,140, or a total output for this period of \$894,260, the total output from January 1, 1901, to July 1, 1902, being \$1,470,405.44.

The fact that the average value of the ore shipped in 1901 was higher than that shipped during the first half of 1902 is accounted for by the fact that the ore shipped in 1901 was more carefully assorted, as it came from near the surface, while that shipped in 1902 came from the deeper workings, which produced larger bodies of ore of more uniform values and which required but little assorting.

The great bulk of this ore still remains on the dumps awaiting the advent of reduction works, only the richest having been sent to California, Washington, Salt Lake, and elsewhere for reduction by reason of the great expense of transportation (about \$50 per ton), to pay running expenses pending the erection of reduction works right at the mines.

WORKING UNDER DIFFICULTIES.

The weather was very severe during the early part of 1901, and very little work could be done in the mines until late in the spring, as the work was practically all on the surface at that time.

At first nothing but windlasses were used, as the distance from source of supply—the railroad—and lack of money made it a difficult matter to procure the requisite machinery. Later on a few horse whims were brought in, and by their aid a number of the lessees were enabled to reach greater depth. Thus it was not until late in the summer of 1901 that the large and rich ore bodies were reached at a depth of over 100 feet.

THE RICH MIZPAH LEDGE.

The Mizpah ledge, as far as it has been developed, for over 1,000 feet in length and 400 feet in depth, averages from 4 to 5 feet in thickness, and in values over \$100 per ton. It is nearly perpendicular, dipping a little to the north, and its strike is nearly east and west. The walls of the ledge are very regular and smooth and show a good gouge. The rich ore is found in chutes in the ledge, which pitch to the east at an angle of about 35 degrees. In places these chutes are from 6 to 8 feet or more in width and average over \$500 to the ton. The wall rock is highly mineralized for some distance on each side of the ledge, and that inclosing the rich ore chutes carries fine milling values for 15 feet or more on each side.

The eight claims composing the main group belonging to the Tonopah Mining Company contain over fifteen known ledges which crop out on the surface, but the Mizpah is the only one in which any development has been done to speak of. The work which is now going on will develop the other ledges of this group within the next year. A number of these other ledges give strong promise, from surface indications, of being stronger and better even than the Mizpah itself. The ledges are all running nearly parallel and are converging toward Mount Oddie, on the southward slope of which the main mines are located.

The ore in these mines is fine-grained black sulphurets in a quartz gangue, containing a small amount of iron and manganese. As far as the ledges have been opened up they also show much chloride of silver.

The gold is not in a free state.

GENERAL PROSPECTS.

The ledges only crop out for about 1,000 feet in length, and on either end there is an overlying flow of porphyry which caps them over, making it difficult to trace them, but the underground developments are gradually solving the mystery, both east and west. Owing to the scarcity of fuel and water, gasoline hoisting engines have been installed, the largest hoisting engine of this kind in camp being 44 horsepower. There are quite a number of small ones of 12 to 32 horsepower. Development work has been greatly retarded from the causes mentioned, but in the next year both water and electric power will be brought into camp in liberal quantity, and work will go forward freely and rapidly.

The Tonopah Mining Company, realizing the size and richness of its property, has built a good, substantial stone office, with assay and surveying buildings, and is planning everything on a large scale for the future. It is timbering its working shafts in a very thorough manner with heavy Oregon pine timbers, the main shaft being of three compartments which are $4\frac{1}{2}$ by 5 feet each. It has ordered a large steel hoist and gallows frame, which will be ready for delivery the last of the present year.

Owing to the phenomenally fine showing made in the Tonopah mines, outside companies have been formed which are doing extensive development work. They are located on all sides of the main group, and many of them are on the strike of the known ledges.

TONOPAH FRACTION MINING COMPANY.

This company purchased a claim west of the canyon in which the town of Tonopah is situated last fall and sank a vertical shaft 200 feet through the white porphyry, capping into the regular mineral-bearing porphyry, sinking to the depth of 238 feet by means of a horse whim. The cable was not long enough to sink any deeper, so a north crosscut was started, which, at a distance of only 20 feet, cut one of the Valley View ledges, about 6 feet wide and showing high values in gold and silver. An engine was purchased and the shaft sunk deeper, running into the same ore at 250 feet and continuing in it to the 300-foot level, all in rich ore. A new three-compartment shaft was started about 500 feet to the southwest, which is now down 250 feet, and at 400 feet it will be connected with the first shaft. The ore developed is of very fine character, resembling that of the Consolidated Virginia Bonanza so closely that old Comstock miners can not tell them apart. This very rich strike encourages this company to development work on the most liberal scale.

GOLD HILL MINING COMPANY.

This property consists of three claims adjoining the main Tonopah group on the south and in the same formation, showing well-defined walls and increasing in size and value as depth is attained. They have already shipped over \$15,000 from one of the smallest ledges near the surface and are making plans for extensive development work in the near future.

TONOPAH TUNNEL AND MINING COMPANY.

This company runs the main tunnel projected right through Mount Oddie, having commenced operations in the spring of 1901, claiming 3,000 feet in length and running at right angles with the Tonopah group of ledges, which it must eventually intersect. It is one of the most promising locations in the camp, as all the main ledges are converging and the rich ore chutes dipping directly toward it, so it is fair to presume that great ore bodies will be developed by it in due time.

OTHER GOOD CLAIMS.

The Tonopah and Salt Lake claims consist of the Wandering Boy and the Stone Cabin, lying south and west of the Gold Hill group. The Wandering Boy has a fine showing of good ore in sight and is considered one of the choice claims of the district.

The Acenith Mining Company, the Halifax group, and the Mizpah Extension, Tonopah City, McNamara, West End, Ohio Tonopah, and Montana Tonopah companies all have extremely eligible locations in the vicinity of the main Tonopah group and are considered of high prospective value.

TONOPAH ELECTRIC POWER AND WATER SUPPLY.

If all the various projects for furnishing Tonopah with water proved successful, that sterile desert town would be deluged inside of a few months, instead of having to depend upon a meager supply hauled in barrels from a distance. But the most tangible enterprise in that line is that of the Tonopah Electric Power and Light Company, which has already completed surveys and is starting operations to bring in water from Twin Rivers by means of a pipe line 60 miles in length. This pipe will be constructed of wood, wound and firmly bound with steel wire, and of sufficient capacity to deliver 1,000,000 gallons of water per day, six months hence, or about March or April, 1903.

In addition to the great water pipe line, with its capacious receiving and distributing reservoir, there will be a great electric power plant established, and a custom mill or reduction works of large capacity, to be worked by electric power, for the treatment of Tonopah ores, notably the great accumulation still remaining on the dumps of the leasers; the town itself will also be supplied with electric light and power for all purposes. The company consists of Philadelphia capitalists, with a million dollars already in the treasury, subject to the chief engineer's vouchers, and plenty more in pocket if required.

NEW MEXICO.

By R. E. TOWNE.

INTRODUCTORY REMARKS.

While the booms in the oil fields of New Mexico, Texas, and California, the continued rich finds of gold in Alaska, and the newly discovered gold and silver veins in Wyoming and Idaho have all had a tendency to attract some of the smaller prospectors from the fields of New Mexico, it is a noteworthy fact that the older companies were engaged in deepening their shafts, erecting new plants, and thoroughly equipping their mines and making extensive preparations for mining on a larger scale than ever before.

New Mexico has shared in the wonderful development in railway lines which has taken place in the last three years. The great advantage of these new lines to the mining industry, in camps already in operation as well as to prospecting in the undeveloped localities, will be of incalculable value and will greatly increase the output.

The Santa Fe Central Railway and the Albuquerque Eastern Railway, now under construction, will form a junction with the Santa Fe system and will cross that system at Kennedy, near Galisteo. It is intended to connect at Santa Fe with a proposed railway to Durango, Colo., and, possibly, with a line by the way of Taos to Fort Garland, Colo.

These proposed lines and their spurs will traverse some of the richest mining country and take in some of the most extensive mines in New Mexico, among which are the big copper smelters of the Santa Fe Gold and Copper Company.

The Rock Island route also is projecting a line that will reach into the heart of the mining region. This road now runs within a short distance of some of the best camps in New Mexico.

BERNALILLO COUNTY.

In Bernalillo, one of the central counties, is situated the widely known Cochiti mining district, which is one of the richest in the Territory. This productive region lies near the head of Pino Canyon, not far from the Rio Grande River, and embraces a mineral tract about 6 by 7 miles which has been mined with most profitable results. Rich ledges of gold quartz zigzag their way across this belt and handsome returns have been secured.

The Altoona, a short distance from Bland, has proved to be a valuable property, as have also the Star, the Crown Point mine, Washington, and a number of smaller camps. At present there are two mills in the Cochiti district and two more will be erected shortly.

Some of the other mining camps thus far only partly developed are the gold-producing Hell Canyon, La Placitas, Coyote Canyon, etc.

Copper City and Algodones give rich and abundant copper crops. A new smelter is under construction at the latter place and will do much toward the rapid development and improvement of the camp. Much of the low-grade ore of this district makes a fair showing, and the higher-grade ore often runs \$40 and upward in gold.

COLFAX COUNTY.

Colfax County has the advantage of a railway throughout its entire length, the Atchison, Topeka and Santa Fe traversing it from north to south, and the Colorado and Southern trailing 17 miles across the northwestern part of the county.

Baldy Mountain and the mountains adjacent produce gold and silver in large quantities. Placer mining has been carried on for twenty-five years in the Creek and Ute regions. Silver and lead are also found in paying quantities. A new railway line is projected and will probably be built next year.

DONNA ANA COUNTY.

Donna Ana County, lying far to the south and bordering on Old Mexico and Texas, forms a huge bed for the Rio Grande. Along its northern boundary are the mountains of the Magdalena, Sierra, and Caballo ranges, and to the west lie the Sierra Oscura, San Andreas, and Organ mountains. Most of the mining camps of the county are in these mountainous regions, the Las Cruces and Gold Camp being two of the most important.

The Bennet-Stephenson and the Modoc mines yield lead and silver, while the Torpedo and Excelsior are famous copper producers. The district is being developed surely, if slowly, and numerous claims have been located which promise well for the future.

EDDY COUNTY.

Only slight traces of gold have been found so far in Eddy County, and these in the southwestern part of the county. Very little prospecting has been done.

GRANT COUNTY.

Grant County, occupying the extreme southwestern portion of the Territory, is considered the richest mining county in New Mexico. Not only are gold, silver, and precious stones found here in abundance, but copper, iron, zinc, and other minerals likewise exist in paying quantities.

Blessed with many streams, some of considerable size, this region has plenty of water available for mining its gold and silver.

The mountain ranges are mostly of volcanic origin and are nature's safety deposit vaults, in which are hidden vast stores of wealth, for which man, in both his savage and civilized state, has been seeking for more than a century. The Santa Rita copper mines were probably worked by the Spaniards more than a hundred years ago, and the Indians delved for the metal even before that time. However, it is only recently that capital has been invested to any extent.

It is in Grant County that the well-known Pinos Altos mines are located. The new concentrating mill erected a short time ago has

been successfully operated for months and a great saving of gold has been made. The yield from the Pinos Altos marks it as one of the leading mines in the whole Territory.

Among other profitable properties in this district is the Arizona mine, which is owned by St. Louis capitalists. The ore from this mine gives a rich yield of gold, silver, and copper; the mine is one of the best paying in Grant County. A concentrating plant will shortly be erected.

The Silver Cell group is another good property. The output from this mine is mostly silver ore, which often runs 5,000 ounces to the ton. The company has excellent facilities for handling all of their own product.

The Mountain Key well deserves its name, for it has been the means of unlocking several large fortunes. It is in excellent condition, improvements completed, and ready for extensive work.

The Dover, Golden Giant, Mammoth, and the Crumbine send out encouraging reports.

The Texas is one of the largest active mines in the district. The Fort Bayard and Refining Company own this mine and have equipped it thoroughly. Some rich finds have been made here.

The Santa Rita Copper Company mine, one of the oldest and best-worked copper properties, is in Grant County. Much development work has been done, new plant installed, and a fine water system put in. This mine has been worked for hundreds of years.

The Wild Cat, San Jose, and Ivanhoe are fair producers of copper, lead, and silver ores. The Hanover and Fierro, the latter operated by the Colorado Fuel and Iron Company, are near Santa Rita.

The Azure Mining Company and the Gem Turquoise and Copper Company operate the turquoise and copper mines in the Burros Mountain district, not far from Silver City. Silver ore, as well as large copper deposits, is also found in this district.

The Pacific Union Smelting Company and the Lena Mining and Milling Company are installing complete plants for handling their ores, which run well in gold, silver, and copper. Both of these large properties are near Lordsburg. The Lena Mining and Milling Company are putting in a 150-ton concentrator and 25-ton furnace.

The Alhambra mine yields rich silver ore, while the Gold Hill, Standard, and Nancy Lee are gold-producing properties.

LINCOLN COUNTY.

The mining industry in this county is important and profitable. Its gold mines are known throughout the world and are celebrated for the high grade and richness of their ores. Silver, copper, lead, and many of the baser metals are found here in abundance.

The principal mining districts are White Oaks, Jicarilla, Bonita, Nogal, Capitan, Gallinas, etc. Within these districts are more than a hundred patented properties, and the Old Abe mine in the White Oaks district is one of the best known in New Mexico. The daily output of this mine is about 50 tons, and this is treated on the ground. A new shaft has been sunk to a depth of over 1,300 feet. The gold of White Oaks is free-milling and averages \$8 to the ton. Many rich leads have been found here.

In the Jicarilla district are placer mines which have been worked for centuries. The American Placer Company have important interests here and have installed the most modern of placer-mining equipment. The district yields gold, silver, copper, etc.

The principal mines of the Nogal district are the Rockford, Clipper, Helen Rae, American, Klondike, Philadelphia, and the Vera Cruz. Many of these mines are equipped with mills. The properties run well in gold and have yielded fortunes to their possessors.

In the Gallinas district the Hoosier and Old Hickory are productive copper mines. The American Consolidated Copper Company owns and operates large properties in the Gallinas, as well as other places throughout New Mexico. These mines are accessible to railroads.

The United Gold and Copper Company own the valuable and promising Anaconda group of silver claims, upon which extensive improvements are being made.

In the Bonito district valuable gold discoveries have been made recently, and it will without doubt become one of the most profitable producers of gold and silver in the entire Territory.

The railroads have increased their shipping facilities considerably within the past eighteen months, and many new localities have been opened to development.

LUNA COUNTY.

Luna County, one of the border counties of New Mexico, touches Grant County on the western boundary. The Graphic Mining Company owns some good mines, from which has been taken about \$500,000 in silver and lead. During the last decade the El Paso Smelting Company have secured from this region almost \$2,000,000 worth of ore, which often averages \$500 a carload. The Flower Queen, Chance, and Leadville produce lead and silver in paying quantities.

The Victoria district is situated near the line of the Southern Pacific Railway and has yielded in gold, silver, and lead more than \$1,500,000 since it was opened.

The Chance and the St. Louis are two valuable properties in this region. The Hermanos, Yellow Jacket, and Hancock, also the A. J. Clark group of mines, are profitable properties, yielding silver and lead, with a small proportion of gold.

Silver Cave and Carizililo produce silver and copper. Only a small portion of this county has been prospected, and many of its mines are only partly developed. Better shipping facilities are needed; still, the outlook is encouraging.

OTERO COUNTY.

Although Otero is a recently organized county, the mining industry has made rapid strides. Most of the prospecting has been done in the White Mountains and the Jarillas. The Jarilla is the most important mining region, and the completion of the railroad in this county has hastened the work of mine development. The Lucy and the Nannie Bird both ship considerable gold, silver, and lead, while a fair yield comes from placer mining.

The famous De Meules turquoise mines are located in this district, and heavy copper deposits are found. The Philadelphia Copper Company have opened a mine which is giving a fair return of copper and gold.

Gold quartz has been found in considerable quantities near La Luz Creek and on Tularosa Creek, and extensive operations are in progress. Much copper ore, yielding silver and gold, has been found.

SAN JUAN COUNTY.

Most of the mining in this county is confined to placer work along the San Juan River. Gold, silver, and copper are found in paying quantities, although very little systematic prospecting has been done.

SAN MIGUEL COUNTY.

In this county the Las Vegas mine is the one of most importance. It contains large copper deposits with a considerable showing of silver ore. The Rociada district has been prospected with good results.

SANTA FE COUNTY.

Santa Fe County occupies a central portion of New Mexico and is crossed by the Atchison, Topeka and Santa Fe Railway, the Denver and Rio Grande forming a junction with this road at Santa Fe city. The Santa Fe Central is a projected road, which when completed will connect with the Denver and Rio Grande at Camaleon.

Prominent among the mines of the county are the Golden, San Pedro, Santa Fe, and Dolores. Some of these are placer mines and were worked by the conquering Spaniards centuries ago. Millions of dollars have been taken from the Dolores and Golden mines alone.

Much of the gold from these mines is coarse, and frequently nuggets of considerable size are found. It is not unusual to pick up numbers of these after a heavy rain.

The scarcity of water in this locality handicaps the prospectors, but when the irrigation problem for the West has been solved there will be rich developments in Santa Fe County. It is an accepted fact that from the old Ortiz mine alone over \$5,000,000 worth of gold has been taken, and this, too, with crude mining implements.

Recently modern machinery has been installed and the product treated on the ground. The Baton is also rich in gold ore, while the Golden yields gold, silver, lead, and also zinc.

South of the Golden are the San Pedro copper mines, which are paying handsomely. Improvements are being made and a fine smelting plant has been erected.

The American Turquoise Company own and operate the Turquoise, the renowned gem mines of New Mexico. Considerable prospecting has been done in the mountains, and results show that the mineralogical possibilities of Santa Fe County are attracting the attention of practical miners and those who have money to invest.

SOCORRO COUNTY.

In this county, the largest in New Mexico, interspersed with lofty mountain ranges, giving evidences of mineral wealth, it is surprising that comparatively so little has been done in mining. However, this is probably owing to the distance from railroads.

Socorro, Water Canyon, Magdalena, Black Range, Mogollon, San Andreas, Pueblo, Kelly, Gallina, and Santa Rita are some of the principal mining districts. The county has 9 stamp mills, 2 concentrating

plants, and 3 reduction plants, although some of the smelters have been idle for several years.

The Mogollon district has yielded more than \$5,000,000 in gold, although it first gained renown as a silver-producing region.

The yield of gold from the Kelly mine is also heavy. The Black Range has rich copper deposits. Lead and coal are also found in large quantities.

The Silver Bar Copper Mining Company, operating in this district, is taking out gold, silver, and copper in large quantities, most of which is sent to the smelters at Silver City, although the low-grade ore is usually treated at the mills on the grounds.

NEW MEXICO.

By J. L. HODGES,

Assayer in charge United States mint, Denver, Colo.

The values of the gold, silver, copper, and lead produced in the Territory of New Mexico during the calendar year 1901 amounted to \$2,641,690, divided as follows:

Gold, at \$20.67 per fine ounce.....	\$716,354
Silver, at \$0.5895 per fine ounce.....	452,636
Lead, at \$0.04334 per fine pound.....	276,959
Copper, at \$0.16555 per fine pound.....	1,195,741
Total	2,641,690

The year was a disappointment from a mining standpoint, due, in some measure, to the early closing down of the smelters at El Paso, Tex., and Silver City and Cerrillos, N. Mex., which treated in considerable quantity the ores of the mining districts. Projected mining developments were arrested and much work already done was abandoned for the time being owing to a fear, for which there was more or less ground, that the tendency to increase smelting and freight rates would render shipments to distant reduction works unprofitable.

The decline in the price of lead and copper from that of the preceding year materially restricted the output of such ores and correspondingly affected, in certain districts, the output of gold and silver.

EDISON PLANT SUSPENDS.

The Edison plant at Dolores, which conducted extensive experiments in the electrical treatment of dry sands or cement beds in lower Santa Fe County for their gold values, finally suspended operations.

County.	Gold (value).	Silver (commercial value).	Total value, gold and silver.	Lead (value).	Copper (value).	Total value.
Bernalillo.....	\$193,919	\$72,657	\$266,576			\$266,576
Colfax	56,190	30,334	86,524			86,524
Doña Ana.....	3,655	9,005	12,660	\$7,100	\$85,000	104,756
Grant	277,055	107,030	384,085	80,000	937,558	1,401,643
Lincoln.....	74,468	237	74,705		2,000	76,705
Santa Fe.....	1,720	27	1,747			1,747
Socorro	28,057	40,062	68,119	23,000	120,000	211,119
Sierra	29,615	134,338	163,953	110,948	10,000	284,901
Counties unknown	51,675	58,950	110,625	55,911	41,183	207,719
Total.....	716,354	452,640	1,168,994	276,959	1,195,741	2,641,694

SOURCE OF PRODUCT.		Fine ounces.
Gold:		
From quartz		31, 768
From placer		2, 889
Total		<u>34, 657</u>
Silver:		
From quartz		201, 785
From lead ores		130, 626
From copper ores		435, 419
Total		<u>767, 830</u>

OREGON.

By FREDERICK A. WING,

Assayer in charge United States assay office, Seattle, Wash.

By a thorough and systematic method of checking the receipts of bullion and ores, originating in Oregon, deposited at and shipped to the several assay offices, mints, smelters, and refineries of the United States and British Columbia, the output for 1901 was found to be as follows:

PRODUCTION OF PRECIOUS METALS IN THE STATE OF OREGON DURING THE YEAR 1901.

Metal.	Quantity.	Value.
Gold.....fine ounces..	88,759.473	\$1,834,821.15
Silver (coining value).....do.....	163,873.41	211,876.73
Copper (at \$16.117 per hundredweight).....fine pounds..	25,462.00	4,103.71
Lead (at \$4.33½ per hundredweight).....do.....	37,650.00	1,631.50
Total value		2,052,433.09

The output of gold from Oregon for the calendar year 1901 shows a substantial increase, notwithstanding the fact that during the year many of its best developed and usually producing mines were closed down for portions or all of the year, some for the purpose of installing new sinking plants or other machinery, some from labor troubles, some on account of lack of ore, or other causes. By comparing the output for the year with that of 1900 a gain of \$146,257.68 will be found.

PRODUCTION OF PRECIOUS METALS IN OREGON DURING THE YEAR 1901, COMPARED WITH THAT OF 1900.

Metal.	1900.		1901.	
	Quantity.	Value.	Quantity.	Value.
Gold.....fine ounces..	83,566.781	\$1,727,892.11	88,759.473	\$1,834,821.15
Silver.....do.....	132,042.07	170,721.06	163,873.41	211,876.73
Copper.....fine pounds..	21,101.00	3,416.25	25,462.00	4,103.71
Lead.....do.....	94,874.00	4,145.99	37,650.00	1,631.50
Total.....		1,906,175.41		2,052,433.09
Net increase				146,257.68

Without question Baker County still holds first rank among the many counties of the State that contribute regularly to Oregon's mineral wealth, and from present indications it bids fair to increase its lead very materially, from the fact that the ores in the several districts seem to be increasing in value as they attain greater depth.

Late in the year very rich ledges were tapped in the North Pole, Columbia, and Golconda, which should greatly enhance the value of their output for the coming season, unless they close down for some reason or another, which, by the way, seems to be the custom in vogue in Oregon. Should it ever be the good fortune to have all the well-developed and producing mines in Oregon run continuously for a whole year, they should produce something nearly approaching the output claimed for the State by its hitherto misinformed press. The facts are good enough. Oregon is rich in mineral resources. Fifty years have not sufficed to exhaust the placers of the State, and there is ground enough that will pay to work to keep them busy for fifty years to come, while the quartz ledges of the State are practically untouched. It only needs a trip through the mining districts of Coos, Baker, Union, Grant, Douglas, Jackson, Lane, Josephine, Malheur, and other counties to convince the most skeptical that a magnificent future awaits this grand State in point of mineral wealth.

New conditions have arisen and are being promptly met; old processes that have proven unprofitable are being discarded and new ones installed. In every district new mills are being erected and old ones increased, demonstrating the fact that Oregon's mining industry is in a healthy condition. Much prospecting is being done in all directions, and new districts are coming into prominence by the very fact of the wonderful showing made. Among the new districts in eastern Oregon that are attracting attention and bid fair to become prominent are the Greenhorn, lying west of Sumpter, and the Quartzburg to the southwest. The placers of Josephine and Jackson counties continue to be large producers, and the Bohemia quartz properties are contributing their usual quota to the output of the State. Extensive improvements in the way of hydraulic machinery to supplant the old ground-sluicing process, has had a tendency to stimulate the old time industry on Galice Creek, and the output of the Coyote district in northern Josephine shows a material increase. The producing mines reporting are as follows:

BAKER COUNTY.

California mine, at Sumpter; Sam Lang placer mine and Duckworth, Littlefield & Co., placers, Auburn district; Rye Valley Placer Mining Company, Rye Valley; Connor Creek Mining and Milling Company, at Connor Creek; Winterville placer mine, Burnt River district; Virtue Consolidated Mining Company (Virtue and Collateral mines), Virtue district; Gold Ridge Mining Company, Express; Treasure placer mine, Mormon Basin district; Never Swet placer mines, Pocahontas district; Clark Creek placer mines, Clark Creek district; Flick Bar Placer Mining Company, Snake River district; Chicken Creek placer mines, Chicken Creek district, and Sanger mine, Sanger district.

COOS COUNTY.

Salem placer mines, Johnson Creek district; St. Patrick and Mountain Daisy placer mines, South Sixes district, and Randolph Beach placer mines, Randolph district.

DOUGLAS COUNTY.

Lewis Ash placer mine, Riddles district.

LANE COUNTY.

Lucky Boy Mining Company, Blue River district.

GRANT COUNTY.

George Armstrong placer mine, Susanville; Big Creek Deadwood Mining Company, placer, Big Creek district; Great Northern Mining Company, Caledonia placer mine, Marysville placer mine, and Quartz Gulch placer mine, Canyon district.

JACKSON COUNTY.

Little Frenchman placer mine, Cook's placer mine, Lane Brothers' placer mine, Foots Creek district; Iron Mountain placer mine, Sams Creek district; Red Hill placer mine, Grave district; Dandy mine, Upper Grave district; Gold Hill Mining and Developing Company, Blackwell district; Vroman placer mine, Sardine Creek district; Lone Star placer mine, Sykes Creek Placer Mining Company, and Evans and Pleasant Creek Mining Company, Pleasant Creek district; Hydraulic Mining Company (Howland & Cook placer mines), Jump-off-Joe district; J. W. Opp, Jacksonville; D. J. S. Pearce & Son, and Sunset mine, Forest Creek district.

JOSEPHINE COUNTY.

Stratton Creek placer mine; Savage & Mellen placer mine, Missouri Flat district; Red Dog Ditch Mining Company, placer, Briggs Creek district; O. R. Swearinger (Ida mine), Louse Creek district; Dry Diggins Placer Mining Company, Dry Diggins district; Vindicator Placer Mining Company, and Saunders placer mine, Wolf Creek district; Oregonian mine, Golden Wedge mine, and Merrill placer mine, Galice district; Fry Gulch mine, Waldo district; Little Dandy placer mine, Grave Creek district; Althouse Placer Mining Company and Mountain Slide placer mine, Althouse district; Victor Junior Mining Company (Greenback mine); Ruble hydraulic mine, Coyote district; and Horsehead placer mines, Williams district.

MALHEUR COUNTY.

Home Stake mine, Eldorado Ditch Mining Company (Rich Creek placer mines), and J. A. Blair, placer mine.

WHEELER COUNTY.

Rosa D. and Bonanza mines, Spanish Gulch district.

The disposition on the part of many of those interested in the mining industry of the State to absolutely refuse information concerning the output of their properties or to willfully attempt to mislead one works against the best interests of many of the counties and is incomprehensible. The destination of every ounce of gold or silver, whether in shape of bullion, smelting ores, or concentrates, can be and is ascertained, and furnishes the totals published above, but exact credit can not be given to the several counties and districts until the operators in the aforesaid counties and districts will furnish reliable figures for that purpose.

PRODUCTION OF GOLD AND SILVER IN OREGON (ORIGIN DETAILED), DURING CALENDAR YEAR 1901.

Origin.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Placer	19,969.000	\$412,795.87	2,325.00	\$3,006.06	\$415,801.93
Quartz	68,455.473	1,415,100.21	158,178.41	204,513.50	1,619,613.71
Copper ores	25.000	516.80			516.80
Lead ores	310.000	6,408.27	3,370.00	4,357.17	10,765.44
Total	88,759.473	1,834,821.15	163,873.41	211,876.73	2,046,697.88

BULLION OF OREGON PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1901.

Institution.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Mints:					
Philadelphia	765.627	\$15,826.91	140.49	\$181.64	\$16,008.55
San Francisco	7,895.483	163,214.12	1,980.37	2,560.48	165,774.60
Assay offices:					
Boise	42,593.856	880,493.15	14,625.47	18,909.70	899,402.85
Denver	54.947	1,135.86	13.17	17.03	1,152.89
Helena	95.161	1,967.15	26.43	34.17	2,001.32
Seattle	234.091	4,839.09	50.68	65.52	4,904.61
Total	51,639.165	1,067,476.28	16,836.61	21,768.54	1,089,244.82

DISPOSITION OF GOLD AND SILVER OF OREGON PRODUCTION DURING THE CALENDAR YEAR 1901.

Disposition.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Deposited at the United States mints and assay offices	51,639.165	\$1,067,476.28	16,836.61	\$21,768.54	\$1,089,244.82
Shipped to custom smelters and refineries by producers	37,120.308	767,344.87	147,036.80	190,108.19	957,453.06
Total	88,759.473	1,834,821.15	163,873.41	211,876.73	2,046,697.88

SOUTH APPALACHIAN STATES.

By W. S. CLANTON,

Assayer in charge of the United States assay office at Charlotte, N. C.

The precious-metal product of these States in 1901 amounted to \$382,628.25 (coining value), an increase of \$66,594.55 over 1900, or a little more than 21 per cent.

SUMMARY, 1900 AND 1901.

State.	Gold.			Silver (coining values).		
	1900.	1901.	Increase (+) or de- crease (-).	1900.	1901.	Increase (+) or de- crease (-).
Alabama.....	\$2,618.45	\$3,772.67	+\$1,154.22	\$64.62	\$53.26	- \$11.36
Georgia.....	124,527.87	147,579.81	+23,051.94	632.39	869.67	+ 237.28
Maryland.....	391.66	139.54	- 252.12	1.95	.33	- 1.62
North Carolina.....	44,653.28	60,410.71	+15,757.43	15,986.05	34,023.64	+18,037.59
South Carolina.....	122,656.65	127,305.50	+ 4,648.85	506.31	396.68	- 109.63
Tennessee.....	310.36	254.88	- 55.48	1.39	6.45	+ 5.06
Virginia.....	3,557.77	6,465.11	+ 2,907.34	124.45	1,349.90	+ 1,225.45
Total.....	298,716.04	345,928.22	+47,212.18	17,317.16	36,699.93	+19,382.77

The increased production of this section in 1901 was almost wholly due to the recovery of gold and silver from ores smelted; the extent of such work was unprecedented.

The ores hitherto classed as "shipping ores" have, the last year, largely gone from this section in the shape of mattes, and are so indicated in the headings of the tables.

The Southern Smelting Company, at Oakdale, near Atlanta, Ga., was run a considerable part of the year, and drew its supplies from the whole belt, from Virginia to Alabama.

The Union Copper Company's smelter, at Gold Hill, Rowan County, N. C., erected primarily to treat the ores of that mine, also purchased somewhat extensively. The same statement may be made of the Eustis Smelting Works, at Norfolk, Va., which used for the most part the ores from the Holloway mine, Person County, N. C., but adding thereto large purchases from all the mines of the Virgilina district in Virginia and North Carolina. There was a very general effort to produce ores, especially of copper, from these smelting centers.

The Union Copper Company had accumulated a considerable reserve of smelting ore, and other near-by or not far distant mines had accumulated large dumps of desirable ore in anticipation of a good market.

The Holloway mine, in Person County, the Blue Wing mine, in Granville County, N. C., and the High Hills mine, in Halifax County, Va., were operated largely during the year, so that a vigorous campaign was permitted to the smelting works. The total output of all the smelting works is believed to have been \$94,010.89.

The distribution of the result as between copper ores, lead ores, and other sulphurets is by no means easy to ascertain, but a careful analysis of the data in hand leads to the belief that the distribution is as shown in the table.

A comparison of the sources relied upon prior to 1900 will show inconsiderable increases or decreases, thus indicating a comparatively settled condition of the older modes of the mining industry of this section.

The deposits of this section in 1900, in the various mints and assay offices of the United States, as reported to us, were:

	Fine ounces.
Gold	13, 358. 544
Silver	1, 014. 07

being 80 per cent of the total gold produced, but only $3\frac{1}{2}$ per cent of the silver.

As in the past years, the returns from "works" is due to the Haile Mine Chlorination Works, South Carolina, and to the Creighton Mine Chlorination Works, Georgia, supplemented by a small output of "cyanide" gold.

The heading "River mining," heretofore used in these reports, is in this statement marked "Dredging work," since the aim in present work is to secure the gold in the bottoms and sands adjacent to the rivers, as well as from the river beds.

A very marked activity in investigation of mining properties is now manifest, especially in copper propositions. The very high price of this metal for some years, and the profitable results generally of copper mining, together with the favorable work in the Virgilina district, have stimulated investigation and investment. Not less than seven points in this district are now operated; there are also two points in Guilford County, N. C., three in Rowan County, and two in Cabarrus which are either shipping ore to the various smelters or are on the point of doing so. Several copper properties in Georgia and Alabama are under investigation.

The Ducktown (Tenn.) copper mines, which operate their own smelters, are distinctively copper propositions; the Ore Knob mine, Ashe County, N. C., is of the same character; neither contains more than traces of gold or silver, and it is not known that any precious metals are added to the world's stock from these sources.

The fall in the price of copper has not affected copper-mining work in this region, but the operators are more cautious in their plans; it is too early to predict the result on smelting operations. I merely add that I do not anticipate so large a return from this class of work in 1902.

A small amount of lead ores was marketed from Davidson County, N. C., and a few small parcels from other localities where galena is found sporadically.

Cyaniding was carried on only at the Franklin mine, Fauquier County, Va., and at the Cherokee mine, Cherokee County, Ga. The extraction was not large at either place, and for the present this class of work is discontinued.

The petty mining of the section has sunk to insignificant proportions.

Operators were disposed to be a little more venturesome during 1901, and to depart from the beaten paths of former years.

The disposition of the ore producers to respond to the wants of the smelters was very marked, though not so great as the smelters had expected.

It yet remains for the introduction of a reliable establishment which shall guarantee living prices and satisfactory returns to all classes of ore producers.

MARYLAND.

The production of Maryland has fallen to practically nothing, and consisted of the petty yield of occasional work.

Gold ^a	\$139.54
Silver ^a .....	.33
Total	139.87

VIRGINIA.

The amount produced in 1901 was \$7,815.02, against \$3,682.22 in 1900. This increase was entirely due to the smelting returns from copper ore from Halifax County and from cyanide works. Only one of the distinctively precious-metal mines was worked—the Franklin mine, Fauquier County.

The Virginia Copper Mining Company's property, at High Hills, Halifax County, was worked with vigor in the latter part of the year and very systematically. Two hundred men were employed. The deepest level is 350 feet; the measurement along the vein, from No. 1 shaft to No. 8, is something more than 2,000 feet. Much of the ore extracted is a high-grade bornite, or copper glance. The later work, especially in depth, has developed a large body of low-grade ore carrying 3 to 5 per cent metallic copper, and it is evident that the operators will have to make their calculations on this low-grade material. Several thousand tons of such ore are reported on the dump.

At the present time the mode of treatment is very simple; hand picking of the richer ore is followed by roller crushing and jigging. A rich product is obtained in this way, but it is not followed, as it should be, by fine crushing and table concentration, so that a considerable percentage of the mineral matter is lost.

The management contemplates the installation of a complete concentrating and smelting plant. The ore is now sent to Norfolk and run into a matte of very high grade, for which such ore is admirably adapted. The matte ultimately finds its way to the electrolytical works in New York and New Jersey.

A railroad is contemplated from Virgilina to the mine. The near-by Chapel mine was explored to some extent during the past year, but excepting some trifling shipments nothing of importance was attempted.

The Wall mine, 6 miles northeast from Virgilina, has also a promising appearance. In December it had sunk to the depth of 150 feet. The north lateral was in 28 feet and the south lateral the same distance. Either head shows up well in mineral matter, consisting for the most part of a high-grade bornite with a little glance.

Thirty tons of rich ore had been extracted from these workings, which the superintendent claimed to carry 24 per cent of copper. About

^aCounties unknown,

50 tons of low grade had been sorted out, containing 4 per cent of copper. A small shipment of rich ore had been made.

Recent investigations indicate the extension of the ore belt to the north of Hyco River, Virginia, which had hitherto been supposed to be the northern limit.

County.	Gold.	Silver.	Total.
Fauquier	\$2,547.16	\$14.45	\$2,561.61
Fluvanna	100.00	.23	100.23
Goochland	474.72	1.43	476.15
Halifax	79.63	1,256.74	1,336.37
Loudoun	93.02	.58	93.60
Spottsylvania	1,271.01	58.67	1,329.68
Stafford	425.14	1.86	427.00
Unknown	1,474.43	15.94	1,490.37
Total	6,465.11	1,349.90	7,815.01

NORTH CAROLINA.

As previously indicated, the mineral industry centered mainly in Granville and Person counties, and the whole of it was subservient to the copper industry, the gold and silver being merely incidental; but, incidental or otherwise, the amount of gold and silver, especially silver, extracted in these counties was very surprising and gratifying.

The mines of North Carolina at work in this south extension of the Virginia belt were the Blue Wing, in Granville County, the Holloway and the Danville and Virgilina Copper Company (Copper World), and the Person Consolidated Copper and Gold Mining Company (Yancy), in Person County.

The Blue Wing mine is down 168 feet in a body of bornite, which, after concentration, gives a prime smelting material forming a matte of high grade and quality. The smelting was reported to have been done at the Orford works, but no statement of results have thus far been elicited in response to our request.

The Holloway, 4 miles south of Virgilina, is reported to have been worked to the depth of 450 feet. The material, apparently, is not of so high grade as the output of previous years, nor were the shipments so large.

The Danville and Virgilina Copper Company (the Copper World) was down 150 feet in a body of copper glance. No ore shipments were made in 1901.

The Person Consolidated Copper and Gold Mining Company (the Yancy), 8 miles south of Virgilina, is down 260 feet and nearly 1,500 feet of levels have been driven. Preparations are in progress for a complete mining and smelting plant, capable of dealing with 50 tons of ore per day.

The ore heretofore used has been roughly divided into two classes—by hand picking—the richer occasionally running up to 24 per cent of copper and the poorer running down as low as 4 or 5. The material is a high-grade glance with a little bornite and invariably carries some silver and gold, though the latter does not always occur in sufficient amount to be allowed for.

A large quantity of ore is on the dump. A small amount of ore was shipped in 1901.

The future of this interesting stretch of copper mines, some 16 or 18 miles from northeast to southwest, is, in the present condition of the copper market, decidedly problematic. It is quite certain that the material to be reckoned with hereafter will be of comparatively low grade, requiring a careful, economical, and thorough concentration preparatory to smelting. If the price of copper should rise to its former figure of 16 or 17 cents, there would without doubt be conditions favorable to a large and profitable business; at $11\frac{1}{2}$ cents, or less, the proposition would not be a favorable one. In the former case one or more smelting works would be erected at or near Virgilina to accommodate the whole section.

The situation at Gold Hill bears some analogy to the Virgilina district; only one mine is actively at work here—the Union Copper mine; but the railroad facilities are so good that ore can be brought from other mines, e. g., the Fentress mine, in Guilford County, and the Allen mine near by, in Cabarrus County. Some rich noncupriferous ores were also purchased for mixing. The mine is accommodated with a spur railroad from Gold Hill village, on the Southern Railroad system.

A large concentration plant has been erected there, which, after repeated alterations, is believed to have solved the problem of treating an ore of 3 or 4 per cent of copper (which appears to be about the tenor of the average ore of the mine), with enough gold and silver to give the resulting matte (a 50 per cent matte) a high value.

The smelting department contains roasting furnaces (the old-fashioned reverberatories) with the fusion chamber at the end and two 25-ton smelters. The slag is a singulo-silicate of about 45 per cent silica. The shaft is down 500 feet, and 5 laterals have been run.

Very little ore was stoped out in 1901, the reserve dumps having supplied the materials used, though it is believed that the ore bodies show no signs of exhaustion.

The matte was shipped to northern smelting works for final treatment. The smelter was shut down about Christmas, and the entire plant has since been overhauled; it is uncertain when the smelters will be put in blast again.

Other copper properties not previously mentioned in North Carolina, at work or nearly ready to deliver copper ores, are as follows: The Fentress and the Deep River, in Guilford County; the Cruze and the Gupauro, in Cabarrus County, near Gold Hill; the Emmons, in Davidson County; the Ore Knob, in Ashe County.

Of the distinctively gold mines of North Carolina it may be said that the activity was somewhat greater in 1901, and a greater disposition was evinced to invest in promising propositions.

The work in Nash and Franklin counties remained the same, the only mines worked being the Mann-Arrington, at Argo, Nash County, and the Portis, in Franklin County. The yield was about two-thirds as much as in 1900.

No regular work was attempted in Moore.

In Montgomery County the Russell, the Beaver Dam, the Palmer, and the Steele were operated at intervals.

The Iola mine, in the eastern part of this county, was opened in the spring of 1901; a large body of ore was found of a very good grade, and active work was prosecuted through the year.

The Stanly County mines, chiefly the Parker and the Crawford, showed no material change the last year.

In the South Mountain area the Rutherford mines (the Monarch and the small placers), the Burke County placers, the McDowell County placers, the Vein Mountain, and the Hunt Mountain veins were operated at intervals.

The monazite industry has revived and diverted the attention of most of the mining class.

Some very interesting and promising localities were discovered during the year in both Burke County and Catawba County; two localities in Randolph County and one in Chatham were prospected.

In Mecklenburg County, once the seat of a most flourishing mining industry, the A. J. Wilson, the Summerville, and the Wilhelmina were bullion producers on a small scale. Work at the Grier was discontinued during the summer. The well-known Capps was reopened in the winter with favorable prospects.

The McCombs, or Garriss, was worked for shipping ores for the Oakdale smelter.

The Catawba (Kings Mountain), in Gaston County, was worked on a petty scale.

The Irwindale and the Parkdale placer mines, in Cherokee, were actively operated till the lease expired, in December. Considerable placer work was also done in Iredell County, at the Rufty mine.

The Dutch Creek mines, in Rowan County, were also reopened.

The Phoenix mine, in Cabarrus County, has been opened again and is nearly ready for ore reduction.

At Gold Hill the old and famous Randolph vein (down 745 feet) was partially unwatered with a view to active work, but legal proceedings prevented a further prosecution of this effort, and this inactivity is likely to continue for some time.

The McMakin mine (or Whitney Reduction Company), is down nearly 400 feet, at which depth a good body of ore was found 100 feet thick, as reported. The material is slate, charged with iron pyrites, a small proportion of copper pyrites, some galenite and blende. The mine is equipped with ten stamps and chlorination works. Hitherto the work has been rather of a prospecting nature.

A small amount of auriferous and argentiferous lead-zinc ores was shipped from the Davidson County mines.

The Catawba Placer Mining Company, on the Catawba River, in Gaston County, operated its dredge most of the year, till in the autumn the severe storms wrecked it completely and the freshets carried the wreckage far down the river. There is no prospect of the revival of the work.

In Polk County a little placer work was done.

A very little fitful mining work was accomplished in Catawba County.

In Randolph County the Sawyer mine was worked in a desultory way.

The mining situation in North Carolina is in a favorable condition for satisfactory work in 1902, so far, at least, as ordinary mining is concerned; as to the results of smelting operations no prediction is trustworthy.

County.	Gold.	Silver.	Total.
Burke	\$4,137.14	\$55.73	\$4,192.87
Cabarrus	5,695.51	324.38	6,019.89
Caldwell	63.61	1.63	65.24
Catawba	731.55	17.80	749.35
Cherokee	4,099.94	20.13	4,120.07
Clay	300.67	2.34	303.01
Cleveland	37.51	.22	37.73
Davidson	409.30	128.12	537.42
Franklin	1,812.82	71.74	1,884.56
Gaston	1,141.75	9.91	1,151.66
Greenville	262.33	290.91	553.24
Guilford	4,254.64	126.80	4,381.44
Henderson	231.05	2.02	233.07
Iredell	388.34	4.22	392.56
Lincoln	31.24	.16	31.40
Macon	226.49	1.29	227.78
McDowell	1,797.78	49.78	1,847.56
Mecklenburg	9,014.10	228.35	9,242.45
Montgomery	2,535.11	44.51	2,579.62
Moore	186.05	2.33	188.38
Nash	1,455.98	18.68	1,474.66
Orange	32.91	.23	33.14
Person	3,270.49	26,214.51	29,485.00
Polk	637.36	4.35	641.71
Randolph	1,364.54	23.59	1,388.13
Rowan	8,724.24	6,282.60	15,006.84
Rutherford	1,755.54	19.20	1,774.74
Stanly	1,046.49	8.14	1,054.63
Union	505.47	7.62	513.09
Unknown	4,260.76	62.35	4,323.11
Total	60,410.71	34,023.64	94,434.35

SOUTH CAROLINA.

As compared with the statement for 1900 there is little change observable, the yield being very constant.

In Abbeville, Anderson, Cherokee, Chesterfield, Greenville, Oconee, Pickens, and York the work was almost entirely on placers.

The demand at the Oakdale smelters afforded a good market for ores, and a considerable amount was shipped to this and to other works.

The Douglas mine, in Union County, was closed the greater part of the year.

The Haile, in Lancaster, accomplished substantially the same work as in the previous year, and with like results. The operations of this mine are so established and systematic that little change is observed from year to year. The older forms of concentrating apparatus and the older machinery are being replaced constantly, though the care given to the equipment insures the greatest possible endurance to the machinery. At present greater attention is given to perfecting the details of the work. An unusually large amount of underground development work was carried out in 1901, adding to the already large reserves, which are adequate to several years' operations.

There appear no reasons for expecting any marked change in this State in 1902.

County.	Gold.	Silver.	Total.
Abbeville	\$1,054.51	\$21.90	\$1,076.41
Anderson	44.22	.40	44.62
Cherokee	4,818.23	59.09	4,877.32
Chesterfield	6,611.08	7.80	6,618.88
Greenville	288.20	3.50	291.70
Lancaster	105,582.21	204.69	105,786.90
Oconee	33.50	.08	33.58
Pickens	11.10	.11	11.21
Spartanburg	2,103.68	6.66	2,110.34
Union	3,240.56	53.00	3,293.56
York	1,953.49	35.03	1,988.52
Unknown	1,564.72	4.42	1,569.14
Total	127,305.50	396.68	127,702.18

GEORGIA.

There was a considerable increase in output in 1901, which was chiefly due to returns from ores shipped, a market for which was found within the State at Oakdale, near Atlanta; apart from this item of increase, and comparing the ordinary items of resources, there may have been an increase of some \$5,000 to \$10,000 during the year.

Carroll, Cherokee, Hall, Lumpkin, McDuffie, Meriwether, and White were the centers of milling.

River mining in 1901 was confined to the Chestatee, a little above and for a short distance below Newbridge. Four concerns are operating.

The old Jaquish boat is at Wooleys Ford, 8 miles from Newbridge; the Birch Brothers' boat, which has passed into the hands of George H. Breymann, is on the Chestatee a little above Newbridge. The dredge of the Georgia Dredging Company has been transferred from the Chestatee to the Etowah River, to Dougherty, Dawson County, but can hardly be put to work before early summer.

Orson Hagar, at Newbridge, made a continuous campaign during 1901, with a gratifying result. The entire return from mining of this character was somewhat increased in 1901.

The "black sand," which is supposed to be rich in gold, is, so far, not capable of being handled economically.

None of these dredges depart materially from the type, though each has its peculiar features.

Most of them now employed are of the scoop pattern, so familiar in harbor and marine engineering.

The endless chain and bucket type has not proved strong enough to remove the large rocks and other obstructions in the channel, and hence has been abandoned.

The scoops commonly employed hold from 1 to $1\frac{1}{4}$ tons, and are easily able to make one lift every 35 seconds; 600 tons per day of 10 hours are easily handled. The cost of handling is put at 3 cents per cubic yard, and one cubic yard is generally regarded as the equivalent of one ton. Instead of using a side pontoon, as formerly, a platform is hung on either side of the dredge, over which the material is allowed to run; the riffles and grizzlies, with which it is provided, carry a small amount of mercury in the upper compartments, where much the larger part of the gold is caught. The lower riffles are cleaned up at intervals of some weeks or even months.

The later work of these dredges has not been confined to the river channel, but has been applied to the bottoms adjacent to the river, thus making constantly new channels. The field capable of being worked is sufficient to last some years.

The smelting works at Oakdale was in operation a part of the year only; there is some doubt of the policy to be pursued in the future, but its operation serves a most useful purpose.

The mines at work in Georgia with mill equipments are:

In McDuffie County the Columbia, the Parks, the Tatham, and the National Mining Company.

In White County the Reynolds, the White Consolidated Mining Company, Limited, and the Fasnater.

In Hall County the McClusky and the Potosi.

In Carroll County the Southern States Exploration and Financial Company.

In Cherokee County the Worley, the Cherokee, the Creighton, and the Sovereign.

In Meriwether County the Wilkes and the Live Oak Mining Company.

In Lumpkin County the Calhoun, the Standard, the Crown Mountain, the Dahlonega Consolidated Gold Mining Company, the Dahlonega Gold Mining and Milling Company, and the Wahl.

At the other localities and counties only placer work is done, but the volume of such work is greatly diminished.

The mining work in McDuffie and Hall counties has in no wise altered in the last two or three years, and the same statement may be made of Carroll County.

In Cherokee only the Creighton has done regular work. The details of the last work are not to hand, but the steady output of bullion for several years shows its healthy condition. It is understood that its resources are as large and as valuable as ever.

The Wilkes mine, in Meriwether, is down 160 feet and has become a steady producer of bullion.

The Wahl, at Dahlonega, and the Dahlonega Gold Mining and Milling Company, working the Briar Patch near Auraria, operated steadily during 1901, though the output was not large.

The old and familiar Dahlonega mode of treatment, i. e., sluice and mill treatment combined, is employed at only one point now—at the Crown Mountain mine.

The saprolites in the gold belt have been for the most part exhausted, and the unaltered quartzose schists have hereafter to be dealt with. These apparently are of a lower content in gold than the schists on the surface; they are also harder and more costly to mine, and carry enough sulphurets to make the treatment uncertain and expensive.

Two companies only are doing regular work at Dahlonega; Dahlonega Consolidated Gold Mining Company, 1 mile northeast of town; work at present is confined to the hard quartz and sulphurets of the Benning vein.

The milling establishment employs 120 stamps, 240 concentrators, a roasting furnace, and two 3-ton chlorinating barrels. The ore is brought to the mill on an electric tramway, fed into a Gates crusher of 500 tons capacity per day, and thence is elevated to a belt, which distributes the ore to the batteries. From the concentrator the sulphurets are lifted to the automatic roasting furnace; thence charged into the barrel chlorinators; the leaching and filtering vats are of the familiar patterns.

The entire plant is run by electricity, generated at their own water power. The plant is a very complete one in every respect.

The ore supply is the critical point in the company's operations.

The Crown Mountain mine employs the old method of sluicing, followed by milling.

This property has a large body of almost untouched saprolites in several veins, crossing the properties in long stretches; prominent among these are the Crown Mountain and Findlay belts, embracing some 700 acres.

Its water rights at the head of the Chestatee are ample to afford 1,000 horsepower and to generate all the power needed in its entire line of work. The pumping station on the Chestatee, 3 miles below Dahlonega, employs a Dean triplex pump of 300 horsepower, which

easily lifts 1,900 gallons of water per minute to the summit of Crown Mountain, 550 feet above the river.

This water is distributed to four giants, which can cut down 1,000 tons of ore per day; 500 feet of flumes are employed, supplied with riffles along the entire length. The fine ore is led to bins, and is fed directly to four Huntington mills. The heavier ore is removed from the grizzlies and trammed to the stamp mill, which is furnished with 50 heavy Frazer & Chalmers stamps in 10 batteries for the heavier ore and 10 light Hall stamps in 2 batteries for the special treatment of the softer material. The entire milling plant is supplied with Wilfley tables. Each department has its separate motor.

The disposition of the concentrates has not yet been decided on. The ore supply seems to be adequate and the management economical.

The employment of electrical motive power marks a distinct era in the mining of this section. Its economical success will lead the way to other large enterprises along the entire belt. Wood is now too scarce and coal too costly, by reason of the distance from the railroads, so that a more economical power than steam is essential to cheap mining.

The mining work generally seems to be in a stable condition, and the speculative features of such work has not been conspicuous the last year.

County.	Gold.	Silver.	Total.
Bartov	\$105.47	\$1.00	\$106.47
Carroll	5,790.44	91.43	5,881.87
Cherokee	58,476.06	112.35	58,588.41
Cobb	498.24	1.04	499.28
Dawson	4,787.37	20.11	4,807.48
Dekalb	146.75	1.06	147.81
Forsyth	771.87	4.22	776.09
Gilmer	122.96	.94	123.90
Gwinnett	184.61	1.13	185.74
Habersham	132.43	1.00	133.43
Hall	1,687.44	29.39	1,716.83
Lincoln	230.92	12.75	243.67
Lumpkin	33,262.91	239.63	33,502.54
McDuffie	15,519.55	157.89	15,677.44
Meriwether	7,245.49	4.56	7,250.05
Morgan	163.14	.94	164.08
Oglethorpe	152.58	1.52	154.10
Rabun	349.88	1.48	351.36
Union	1,025.34	2.07	1,027.41
White	13,028.28	143.95	13,172.23
Wilkes	184.78	1.48	186.26
Unknown	3,713.30	39.73	3,753.03
Total	147,579.81	869.67	148,449.48

ALABAMA.

The output is one-half greater than in 1900.

We were unable to learn of any important regular operations at the end of the year, nor is there any prospect for a change in the conditions.

County.	Gold.	Silver.	Total.
Clay	\$302.98	\$1.02	\$304.00
Cleburne	945.84	9.69	955.53
Tallapoosa	2,156.43	41.73	2,198.16
Unknown	367.42	.82	368.24
Total	3,772.67	53.26	3,825.93

TENNESSEE.

This amount was mainly from placer work:

County.	Gold.	Silver.	Total.
Monroe.....	\$50.23	\$0.51	\$50.74
Unknown.....	204.65	5.94	210.59
Total.....	254.88	6.45	261.33

IMMEDIATE SOURCES.

State.	Placers.		Mills.		Chlorination and cyanide works.	
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
Alabama.....	\$1,394.36	\$13.17	\$2,178.83	\$38.92		
Georgia.....	18,042.29	116.14	73,424.78	381.31	\$18,969.51	
Maryland.....						
North Carolina.....	18,529.95	179.81	11,309.77	215.83		
South Carolina.....	7,922.90	10.72	40,629.25	243.30	67,212.89	
Tennessee.....						
Virginia.....	2,645.90	33.42	710.90	35.82	2,454.14	\$13.87
Total.....	48,535.40	353.26	128,253.53	915.18	88,636.54	13.87

State.	Dredge (river) mining.		Shipping ores.		Untraceable.		Total.
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	
Alabama.....			\$199.48	\$1.17			\$3,825.93
Georgia.....	\$12,996.60	\$34.00	19,758.87	319.77	\$4,387.76	\$18.45	148,449.48
Maryland.....					139.54	.33	139.87
North Carolina.....	551.57	3.11	26,792.89	33,592.08	3,226.53	32.81	94,434.35
South Carolina.....			11,395.35	142.54	145.11	.12	127,702.18
Tennessee.....					254.88	6.45	261.33
Virginia.....			544.74	1,264.00	109.43	2.79	7,815.01
Total.....	13,548.17	37.11	58,691.33	35,319.56	8,263.25	60.95	382,628.15

SOURCE OF PRODUCTION.

Derivation.	Gold.	Silver.	Total.
Placers.....	\$48,535.40	\$353.26	\$48,888.66
Mills.....	128,253.53	915.18	129,168.71
Chlorination and cyanide works.....	88,636.54	13.87	88,650.41
Dredge (river) mining.....	13,548.17	37.11	13,585.28
Shipping ores and matte.....	58,691.33	35,319.56	94,010.89
Untraceable.....	8,263.25	60.95	8,324.20
Total.....	345,928.22	36,699.93	382,628.15

CLASSIFICATION OF SHIPPING ORES AND MATTES ACCORDING TO CHARACTER.

Description.	Gold.	Silver.	Total.
Copper ores.....	\$19,735.27	\$34,446.78	\$54,182.05
Lead ores.....	876.63	135.45	1,012.08
Other ores.....	38,079.43	737.33	38,816.76
Total.....	58,691.33	35,319.56	94,010.89

SOUTH DAKOTA.

By FRANKLIN R. CARPENTER, Ph. D., F. G. S. A.,

Mining and Metallurgical Engineer.

The gold deposits of South Dakota are of two classes, called locally the free-milling and the refractory ore bodies. The former are found in the vertical slates of pre-Cambrian origin, and the latter in the horizontal beds of Cambrian age, which immediately overlie the slates.

FREE-MILLING ORES.

These consist of great mineralized zones in the slates and are practically inexhaustible. The best known ore body of this class is the Homestake mine, which may be called an immense ore shoot of more than 400 feet in thickness and of unknown depths. From it more than 3,000 tons of ore are broken daily, supplying about 800 stamps. The extent to which these ore bodies can be worked is limited wholly by the amount of water that can be secured.

The Homestake Company has recently expended nearly a million dollars for increased water supply.

While the greater part of the values in these ore bodies is recovered by simple stamping and amalgamation, there is a part which will not amalgamate and has heretofore been lost. For some years past the Homestake Company has been experimenting with the cyanide process, and most successfully, it would seem, as their experimental plant has been replaced by what is probably the largest cyanide mill in the world, and so satisfactory has been its operation that a duplicate is now being erected.

While the Homestake ore body is the best known of the South Dakota slate deposits, it is by no means the only one. There are many others and, in fact, there seems to be a well-defined succession of these ore bodies passing entirely through the hills from north to south, or, say, for a distance of 60 miles.

The property of the Hidden Fortune Company, adjoining the Homestake, consists of about 300 acres. They are building at Deadwood a large stamp mill for crushing, and intend to employ the cyanide process direct.

Beyond the Hidden Fortune Company, the Belt Development Company has sunk a shaft 700 feet deep, which is said to expose ore in several places. The Columbia Company, which owns a continuation of the Homestake ore bodies to the north, has already two mills and proposes the erection of another at Deadwood. The Uncle Sam mine also belongs to the free-milling class, and is being operated by the Clover Leaf Mining Company. They own a 60-stamp mill, 30 stamps of which are now dropping. The Holy Terror, North Star, and Golden Slipper mines, found in the central Hills, are also free milling and productive. In all, there are 10 stamp mills in the Black Hills treating ore by the free-milling process.

REFRACTORY ORES.

These ores occur in shoots lying upon the Cambrian quartzite, which overlies the slates. They consist of impregnations occurring at the union of the quartzite and overlying lime shales. They vary from 5 to 10 feet in thickness, from 5 to 50 feet in width, and are thousands of feet in length. They lie approximately horizontal, and, unlike the slate deposits, are never free milling.

All sorts of processes have had their day upon these ores. Vast quantities have been treated by roasting and chlorination, and still greater quantities by a process of matte smelting devised by the writer. The ores are very silicious, averaging at least 75 per cent silica. I conceived the idea of smelting these ores with about an equal quantity of dolomitic limestone, to which was added enough of iron sulphide to form a carrier, or collector, in the form of matte, for the gold and silver. During the earlier years of the process no copper at all was employed. Next it was used sparingly with the iron sulphide, and still later a high-grade copper matte was employed, but as the copper was always handled at a loss a return has recently been made to as little copper as possible.

The chlorination process was long employed. This consisted in roasting the ores to free them of sulphur, after which they were chlorinated in revolving barrels, in accordance with the practice of the Newberry-Vautin modifications of the original Plattner process. Three very large mills were erected, none of which are now in operation.

This process did not save the silver, and was not wholly successful with the gold, except upon ores which were more or less oxidized. Ores rich enough to stand the expense of smelting are still so treated, and will doubtless continue to be so treated. As is usual in all mining countries, there has been a decrease in the value of the ores as depth was gained, and the quantity of high-grade ores is not so great as formerly; but their loss is probably more than made up by the utilization of ores that were formerly not worked by any process, and which do not differ materially from those under consideration save that they are of lower grade. In addition to impregnations of quartzite and porphyry occurring at depth, there are mineral deposits at the surface highly oxidized. All these yield their gold to the cyanide process, which has greatly stimulated mining in the hills, there being now eleven cyanide plants in active operation. The first plant built for this process—the Golden Gate mill—was designed to compete with the smelter and the chlorination plants for the higher grades of ore, but it was unable to do so on account of the great loss in the tailings. It, however, formed a field in the treatment of the low-grade ores above mentioned, and is entitled to all the credit due a pioneer mill. The other plants are, respectively, the Imperial, Golden Reward, Highland Chief, Kildonan, Portland, Cleopatra, Dakota, Wasp, Spearfish, and Deadwood-Standard. Their united capacity exceeds 1,500 tons daily. Some of the mills claim to be able to treat ore at a cost not exceeding 80 cents a ton, but probably the average cost is nearer \$1.50 per ton.

There are two smelting works in the Hills employing the smelting process. The larger is located at Deadwood, and is now known as the Golden Reward, but was formerly called the Deadwood and Delaware. The second is the National Smelting Company's works, located at Rapid

City. The two plants are together capable of treating 500 tons of ore daily. The Golden Reward is in continuous operation, but the National suffers from a shortage of ore, owning few mines of its own.

CONCLUSION.

Ores of a grade sufficiently high to be smelted will probably decline in quantity, as they consisted of the richer surface accumulations common to all new mining countries. We need not, therefore, be surprised that smelting, like the chlorination process, may cease to exist in the Black Hills for want of proper ores. The amalgamation process, however, and the cyanide process, as it is employed to supplement the free milling, and directly upon the low-grade silicious ores, will continue to increase in importance, as the ores upon which these two processes depend are, so far as human means are concerned, limitless. The number of tons of ore treated annually will therefore continue to increase, and I do not anticipate any falling off, in the near future at least, in the gross amount of gold produced.

I append herewith complete figures on the gold and silver output of South Dakota for the year 1901. I regret exceedingly that I must report final figures lower than the estimates sent you last January, but final returns did not prove up to estimates and I must cut them down.

You can rest assured that the figures herewith are correct.

OUTPUT OF SOUTH DAKOTA FOR 1901.

Classification.	Silver.	Gold.
Free-milling ores.....fine ounces..	7,980.00	197,726.150
Refractory ores.....do....	76,481.00	117,129.170
Total output of the State.....do....	84,461.00	314,855.320

UTAH.

BY B. H. TATEM,

Assayer in charge United States assay office, Helena, Mont.

The value of the gold, silver, copper, and lead produced by the mines of the State of Utah in 1901 was \$27,091,709.75, having been the largest in the history of the State and a gain of more than \$4,000,000 over the year 1900, which had previously shown the greatest yield.

The quantity and value of each metal produced in 1901, the value of the gold and silver being computed at the coinage rate and that of the copper and lead at the average market price for the year, is shown in the table which follows, together with corresponding figures for 1900, so that the changes can readily be noted:

Metals.	1900.		1901.		Increase (+) or decrease (-).
	Quantity.	Value.	Quantity.	Value.	
Gold.....fine ounces..	195,222	\$4,035,610	184,803	\$3,820,216	— \$215,394
Silver (coinage rate).....do....	9,381,683	12,129,854	11,319,860	14,635,779	+2,505,925
Copper.....fine pounds..	14,416,776	2,334,076	26,931,888	4,340,612	+2,006,536
Lead.....do....	97,485,020	4,260,095	99,102,516	4,295,103	+ 35,008
Total .....	.....	22,759,635	.....	27,091,710	+4,332,075

It may be noted that the net increase amounts to 19 per cent. The increase in silver came from the Park City district, while the production of copper increased in all of the mining districts of the State, but more especially in that of Bingham. The decrease in gold was comparatively small. The location of this decrease was in the Tintic and Mercur districts, and due to various local causes. All other districts of the State show a gain in the amount of gold won, the most noteworthy being Kimberly, where the Annie Laurie mine is located. The Bingham district also shows a very creditable increase in its production of gold.

The changes in the quantity and value of the gold won from the different classes of ore in 1900 and 1901 is shown in the following table:

Classification.	1900.		1901.		Increase (+) or decrease (-).
	Weight.	Value.	Weight.	Value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Quartz and dry ores.....	9,266.185	\$191,549.05	6,688.150	\$138,256.32	—\$53,292.73
Cyanide mill bullion.....	97,615.196	2,017,885.19	98,793.489	2,042,242.66	+ 24,357.47
Lead ores.....	18,580.584	384,094.76	17,724.888	366,405.96	— 17,688.80
Copper ores.....	45,791.842	946,601.39	43,521.388	899,666.94	— 46,934.45
Milling ores.....	23,968.822	495,479.51	18,075.018	373,643.78	—121,835.73
Total	195,222.629	4,035,609.90	184,802.933	3,820,215.66	—215,394.24

In recent years no gold has been taken from the Utah placers. The above table indicates that the decrease in the gold output of 1901 was general throughout all branches of mining except cyanide plants. A small increase of the gold from that class of mining was occasioned by the extensive operations already referred to at the Annie Laurie mine, in Piute County.

The mining of silver in Utah is done largely in connection with ores carrying lead and other metals, where the values have principally been in silver. The mining of such ores was curtailed by the decline in the price of silver that occurred in 1901. In the table given below the origin of silver from the several branches of mining for the past two years, and such changes as occurred therein, are noted:

Classification.	1900.		1901.		Increase (+) or decrease (-).
	Weight.	Coining value.	Weight.	Coining value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Quartz and dry ores.....	251,912.97	\$325,705.64	850,266.61	\$1,099,334.65	+ \$773,629.01
Cyanide mill bullion.....	50,939.11	65,860.69	48,213.26	62,336.34	- 3,524.35
Lead ores.....	5,912,183.96	7,644,035.83	7,357,481.54	9,512,703.35	+1,868,667.52
Copper ores.....	1,442,461.96	1,865,001.32	2,201,143.66	2,845,923.11	+ 980,921.79
Milling ores.....	1,724,185.69	2,229,250.18	862,755.00	1,115,481.21	-1,113,768.97
Total.....	9,381,683.69	12,129,853.66	11,319,860.07	14,635,778.66	+2,505,925.00

From the above it is seen that two-thirds of the entire silver yield of the State originated in ores carrying lead, thus giving an importance to this class of mining far greater than attaches to the others.

The yield of gold in 1900 and 1901, as distributed to the counties of the State, and the changes therein are noted in the following table:

Counties.	1900.		1901.		Increase (+) or decrease (-).
	Weight.	Value.	Weight.	Value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Beaver.....	280.520	\$5,798.86	1,003.718	\$20,748.69	+ \$14,949.83
Iron.....	372.480	7,699.84	.....	.....	- 7,699.84
Juab.....	75,355.792	1,557,742.47	40,158.989	830,159.99	-727,582.48
Piute.....	.....	.....	18,007.721	372,252.63	+372,252.63
Salt Lake.....	12,226.970	252,753.91	27,911.565	576,983.25	+324,229.34
Summit.....	9,093.375	187,976.74	13,731.376	283,852.73	+ 95,875.99
Tooele.....	97,585.492	2,017,271.15	80,978.768	1,673,979.70	-343,291.45
Utah.....	308.000	6,366.93	120.000	2,480.62	- 3,886.31
Wasatch.....	.....	.....	339.729	7,022.82	+ 7,022.82
Impossible to classify.....	.....	.....	2,551.067	52,735.23	+ 52,735.23
Total.....	195,222.629	4,035,609.90	184,802.933	3,820,215.66	-215,394.24

Below are the figures for the silver produced by the different counties for 1900 and 1901, the loss or gain for each locality being shown in the comparison:

County.	1900.		1901.		Increase(+) or decrease (-).
	Weight.	Coining value.	Weight.	Coining value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Beaver.....	143,007.00	\$184,897.94	427,382.00	\$552,574.70	+ \$367,676.76
Iron.....	627.12	810.82	.....	.....	- 810.82
Juab.....	4,809,970.99	6,218,952.40	2,685,734.89	3,472,465.31	-2,746,487.09
Piute.....	.....	.....	48,213.26	62,336.34	+ 62,336.34
Salt Lake.....	238,267.36	308,062.85	706,944.54	914,029.30	+ 605,966.45
Summit.....	3,931,205.00	5,082,770.10	7,060,623.56	9,128,887.03	+4,046,116.93
Tooele.....	258,034.22	333,620.00	305,956.00	395,579.47	+ 61,959.47
Utah.....	572.00	739.55	640.00	827.47	+ 87.92
Wasatch.....	.....	.....	6,303.16	8,149.54	+ 8,149.54
Impossible to classify.....	.....	.....	78,062.66	100,929.50	+ 100,929.50
Total.....	9,381,683.69	12,129,853.66	11,319,860.07	14,635,778.66	+2,505,925.00

BEAVER COUNTY.

The year 1901 witnessed renewed activity in the district around Frisco. This region, lying about 250 miles south and west of Salt Lake City, is reached by a branch of the Oregon Short Line Railroad, thus giving an outlet for the product of its mines to the smelters and markets. For more than twenty years the Horn Silver mine has maintained a steady output from the rich silver ores contained in its properties. These have been sufficiently rich, the operations so extensive, and the management sufficiently wise to have won and paid to its owners more than \$5,250,000 in dividends. The unsatisfactory condition of the silver market in 1901 led this company to pursue a more extensive working of the copper zone, which had been avoided in the mine in previous years when the price of copper was low. This policy of the management in 1901 proved to be a source of large revenue, and the exploration of the copper reserves shows that they are both extensive and high grade.

While nearly the entire output of Beaver County was contained in the 8,400 tons of first-class ore and the 3,150 tons of concentrates shipped by the Horn Silver in 1901, there were also other shipments made by the mines in the district, chief among which was the O. K. mine, belonging to the Majestic Mining Company. This property is opened to the depth of 400 feet, from which development alone some 23 cars of copper ore were shipped, the returns of which yielded an average of 40 per cent in copper in addition to the gold and silver contents.

Much activity and development is going on in the copper-bearing zone of this region, and the results secured have been encouraging. It is believed that among the producers of Beaver County in 1902 will be found the Cactus, The Copper Ranch, Ben Harrison, Skylark, Imperial, Washington, Old Hickory, and Beaver mines.

The quantity and value of each of the metals from Beaver County during the years 1900 and 1901 were as follows:

Metals.	1900.		1901.		Increase.
	Quantity.	Value.	Quantity.	Value.	
Gold .....fine ounces..	280.520	\$5,798.86	1,003.718	\$20,748.69	\$14,949.83
Silver (coining value) .....do....	143,007	184,897.94	437,382	552,574.70	367,676.76
Copper .....fine pounds..	769,648	124,606.01	777,578	125,322.24	716.23
Lead .....do....	3,916,510	171,151.48	6,907,969	301,391.37	130,239.89
Total		486,454.29		1,000,037.00	513,582.71

JUAB COUNTY.

The output of this county originated in the ores mined in the district known as the Tintic, the principal camps of which are Eureka, Silver City, and Mammoth. Here are located the greatest number of noted producers contained in any one single district of the State. The tonnage of ores from the district was enormous, the largest part of which was consigned to the various smelting and reducing plants. The development of prospects is also being earnestly prosecuted, so that new producers are being frequently added.

The output of Juab County shows a very large falling off from that of the preceding year, due to attention having been turned to the

development of the various properties, which resulted in a decreased output while said work was being done. Besides this, some of the greatest producers became involved in unfortunate litigation, thus stopping work until the courts have settled the question at issue.

The greatest producer of gold in the district is the Centennial-Eureka property. The work of the year on this property was most important in that it is said to have exposed large ore reserves. Besides the Centennial-Eureka, the following were among the producers from Tintic, all having made shipments during the year: Ajax, Godiva, Carisa, Gemini, Grand Central, Lower Mammoth, May Day, Mammoth, South Swansea, Swansea, Star Consolidated, Tesors, Uncle Sam Consolidated, Yankee Consolidated, Eureka Hill, and Bullion Beck.

Among the likely producers during 1902 may be mentioned the La Reine, Tetro, Little Chief, Morning Glory, Showers Consolidated, Rabbits Foot, Old Colony, Old Susan, and Joe Bowers.

The production of Juab County for the years 1900 and 1901 is noted in the table which follows:

Metals.	1900.		1901.		Increase (+) or decrease (-).
	Quantity.	Value.	Quantity.	Value.	
Gold .....fine ounces..	75,355.792	\$1,557,742.47	40,158.989	\$830,159.99	— \$727,582.48
Silver (coining value), fine ounces.....	4,809,970.99	6,218,952.40	2,685,734.89	3,472,465.31	—2,746,487.09
Copper fine pounds..	6,052,157	979,844.22	7,557,825	1,218,094.65	+ 238,250.43
Lead .....do.....	36,840,579	1,609,933.30	24,388,133	1,056,981.68	— 552,951.62
Total .....	.....	10,366,472.39	.....	6,577,701.63	—3,788,770.76

PIUTE COUNTY.

On Gold Mountain the principal mine is the Annie Laurie. The ore is worked by a cyanide mill that treats 150 tons daily. About 20 per cent of the values extracted were in the silver contained, the balance being gold. The company worked about 100 men during the year.

SALT LAKE COUNTY.

Mining operations in this county are centered at Bingham and Alta. The former camp is reached by a branch of the Rio Grande Western Railroad, over which was hauled nearly a quarter million tons of lead and copper ores from the district during 1901.

The principal companies taking ore from the Bingham district are the Utah Consolidated Gold Mines, Limited, employing about 200 men, and the Bingham Consolidated Mining and Smelting Company.

Besides the mines belonging to these companies, the property of the United States Mining Company was under active development throughout the year, some 70 men having been employed. There are three or four mills in the camp continuously working. The Dewey is a custom mill. The Butterfield Company also has its own mill. The Rogers Mill has until recently been a custom mill, but has been sold and is to be used for experimental tests on the mines being opened by the purchasers.

Alta, in former days, had some good mines, including the Emma and the Flagstaff. This is a bad winter camp, but the Grizzly and

Lavinia mines have produced a nice quantity of ore during the summer, and a great deal of exploration work was done. The City Rocks, the Oregon, Regulator, and other mines in the camp have sent ore to the smelters.

The various Utah smelters are situated about 5 miles south of Salt Lake City on the Oregon Short Line and Rio Grande Western railroads. The American Smelting and Refining Company's plant treated about 11,000 tons per month, 450 men having been employed. A new plant is under construction, to have a capacity of 1,000 tons per day.

This will be ready about April, 1902, and will also be a custom smelter. The outlook for the mines of the State leads the Company to more than double its capacity.

The Highland Boy smelter is the property of the Utah Consolidated Gold Mines, Limited. The company has treated 70,000 tons of ore during the year. This has all come from the company's mine at Bingham. The Bingham Consolidated Mining and Smelting Company's plant began work on February 1, and simply produces matte containing gold, silver, and copper. The company has treated an average of 450 tons of ore daily and has shipped its product for refining during the year. About 300 men are employed. The United States Mining Company's plant, under construction, is to have a capacity of 1,000 tons per day.

In the following table the value of the gold, silver, copper, and lead for the years 1900 and 1901 are shown:

Metals.	1900.		1901.		Increase (+) or decrease (-).
	Quantity.	Value.	Quantity.	Value.	
Gold fine ounces..	12, 226. 970	\$252, 753. 91	27, 911. 565	\$576, 983. 25	+ \$324, 229. 34
Silver (coining value) .do....	238, 267. 36	308, 062. 85	706, 944. 54	914, 029. 30	+ 605, 966. 45
Copper fine pounds..	6, 196, 660	1, 003, 239. 25	14, 422, 361	2, 324, 451. 92	+1, 321, 212. 67
Lead do.....	5, 270, 495	230, 320. 63	2, 754, 779	119, 392. 12	- 110, 928. 51
Total		1, 794, 376. 64		3, 934, 856. 59	+2, 140, 479. 95

SUMMIT COUNTY.

The Park City district is the largest mining camp in the State, being situated on branches of the Rio Grande Western and Union Pacific railroads. The ores carry nearly all their values in silver and lead, and come from the Silver King, Daly West, Ontario, Quincy, Anchor, and Daly Mines. Nearly all of the enormous output of lead and silver from Summit County in 1901 came from these mines. During the year the Silver King completed its own sampler and tramway for delivering its product to the railroad, some 2 miles distant. These plants are among the most perfect and modern, and prove of great advantage to the company.

Among the many developed properties around Park City are the California, Comstock, D. & M., Silver Bell, and Thaynes Canyon Consolidated, in Thaynes Canyon, of which the California is the only producer. Its mill is being enlarged. The Snake River district, south of Park City, has been very active during the year, and several properties will likely join the regular producers. Some excellent showings have been made and the outlook is encouraging. The Blue Ledge district has the Valeo Mine, which has sent out about 7,000

tons of copper ore to the smelter, by way of Heber. In close proximity are the East Valeo, Ramshorn, West Valco, and other groups in the prospective stage at present. Encouraged by the great showing of the Quincy, several near-by properties have been very active during the latter part of the year.

The output of precious metals shows some increase in 1901 over the year 1900, as is set forth in the following comparisons:

Metals.	1900.		1901.		Increase.
	Quantity.	Value.	Quantity.	Value.	
Gold .....fine ounces..	9, 093. 375	\$187, 976. 74	13, 731. 376	\$283, 852. 73	\$95, 875. 99
Silver (coining value) .do....	3, 931, 205	5, 082, 770. 10	7, 060, 623. 56	9, 128, 887. 03	4, 046, 116. 93
Copper .....fine pounds..	703, 369	113, 875. 44	2, 477, 080	399, 230. 98	285, 355. 54
Lead .....do.....	46, 982, 647	2, 053, 141. 67	60, 232, 236	2, 610, 465. 11	557, 323. 44
Total		7, 437, 763. 95		12, 422, 435. 85	4, 984, 671. 90

TOOELE COUNTY.

This county includes the Ibapah and Deep Creek districts, Mercur, Ophir, and Stockton camps, besides scattered mines about which it is hard to gather definite information. Close to the Nevada boundary is the Queen of Sheba, a gold mine worked by the Rooklidge Brothers. In Fish Springs Mountains are located the Utah and Galena mines, which have produced some of the highest grade lead and silver ore in the State. The Utah has shipped by team to Oasis, on the Oregon Short Line, a distance of 75 miles, an average of 50 tons per month during the year. The Galena has done much development, but has not shipped so regularly. From the Dugway Mountains, farther east toward Stockton, very little ore has been shipped, but a great many properties are being worked, and some good copper deposits have been discovered, as well as silver and lead veins. Stockton is close to the narrow-gauge line running out of Salt Lake City, via Garfield Beach, and is one of the old camps of the State. The largest mine is the Honerine, upon which a large sum has been expended in development. The company has a complete hoisting and pumping plant and is sinking a three-compartment shaft 650 feet. When this is completed regular shipments will start. The ore bodies are reported among the largest in the State. Among the other mines at Stockton are the Cygnet, Silver Coin, West Argent, and Galena King. The camp has been troubled by water in the lower levels, and the production so far has all come from above the water level.

In the Ophir district, close to Stockton, is the Ophir Hill mine, owned by Senator Clark. The ore is low grade. The Mono mine, the Hidden Treasure, and the Utah Queen, in Dry Canyon, are all regular shippers. There are also the Brooklyn, Plymouth Rock, Montana Consolidated, and others, actively worked.

At Mercur the Consolidated Mercur is the principal property at present. The mine is reported looking exceedingly well, and the mill is said to be working at a good profit. During the year 283,000 tons of ore were treated. The management has done much development during the year. An average of 520 men are employed. The Northern Light mine, near Mercur, has men on development work seeking

the continuation of the veins from which so much rich ore was shipped in earlier days. The Chloride Point and the Hercules are not working.

At the Sunshine end of the Mercur district the Sunshine Mine is again being worked, and if gold values can be successfully extracted another producer will be heard from. Nothing is doing at the West Dip, where the Omaha, Daisy, and La Cigale mines are located. These properties caused much excitement a few years ago, but the cyanide mills erected on the two latter properties were complete failures, and the ores in this district await some new process of extraction.

The quantity and value of the mineral product from this county in 1901 is shown in the table below, and is compared with corresponding figures for the preceding year.

Metals.	1900.		1901.		Increase (+) or decrease (—).
	Quantity.	Value.	Quantity.	Value.	
Gold fine ounces.	97,585.492	\$2,017,271.15	80,978.768	\$1,673,979.70	— \$343,291.45
Silver (coining value) ... do....	258,034.22	333,620.00	305,956	395,579.47	+ 61,959.47
Copper fine pounds.	689,362	111,607.60	1,199,476	193,319.55	+ 81,711.95
Lead do....	4,464,469	195,097.29	4,557,818	197,535.83	+ 2,438.54
Total		2,657,596.04		2,460,414.55	— 197,181.49

The following statistical tables show the production of the precious metals of the State for the year 1901, their origin by classes and counties, and the disposition of the same. They have been prepared from carefully collected data, and every effort made to avoid any duplication in the figures:

TOTAL PRODUCTION OF PRECIOUS METALS IN UTAH DURING THE CALENDAR YEAR 1901.

Metals.	Quantity.	Value.
Gold fine ounces..	184,802.933	\$3,820,215.66
Silver (coining rate) do....	11,319,860.07	14,635,778.66
Copper (at \$16.117 per hundredweight)..... fine pounds..	26,931,888	4,340,612.39
Lead (at \$4.334 per hundredweight) do....	99,102,516	4,295,103.04
Total.....		27,091,709.75

PRODUCTION OF GOLD AND SILVER IN UTAH DURING THE CALENDAR YEAR 1901.

Summary by counties.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Beaver	1,003,718	\$20,748.69	427,382	\$552,574.70	\$573,323.39
Juab.....	40,158,989	830,159.99	2,685,734.89	3,472,465.31	4,302,625.30
Piute	18,007,721	372,252.63	48,213.26	62,336.34	434,588.97
Salt Lake.....	27,911,565	576,983.25	706,944.54	914,029.30	1,491,012.55
Summit	13,731,376	283,852.73	7,060,623.56	9,128,887.03	9,412,739.76
Tooele	80,978,768	1,673,979.70	305,956	395,579.47	2,069,559.17
Utah.....	120,000	2,480.62	640	827.47	3,308.09
Wasatch.....	339,729	7,022.82	6,303.16	8,149.54	15,172.36
Returns from custom smelters, mints, and assay offices, impossible to classify by counties	2,551,067	52,735.23	78,062.66	100,929.50	153,661.73
Total	184,802,933	3,820,215.66	11,319,860.07	14,635,778.66	18,455,994.32

BULLION OF UTAH PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1901.

Institution.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Standard ounces.</i>		<i>Standard ounces.</i>		
Mints:					
Denver, Colo	2,725.991	\$50,716.11	459.53	\$534.73	\$51,250.84
San Francisco, Cal	815.121	15,165.04	475.34	553.12	15,718.16
Assay offices:					
Boise, Idaho	589.938	10,975.60	132.83	154.56	11,130.16
New York, N. Y.	78,736.988	1,464,874.20	46,679.08	54,317.47	1,519,191.67
Total	82,868.038	1,541,730.95	47,746.78	55,559.88	1,597,290.83

PRODUCTION OF GOLD AND SILVER IN UTAH (ORIGIN DETAILED), DURING THE CALENDAR YEAR 1901.

Origin.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Quartz and dry ores	6,688.150	\$138,256.32	850,266.61	\$1,099,334.65	\$1,237,590.97
Cyanide mill bullion	98,793.489	2,042,242.66	48,213.26	62,336.34	2,104,579.00
Lead ores	17,724.888	366,405.96	7,357,481.54	9,512,703.35	9,879,109.31
Copper ores	43,521.388	899,666.94	2,201,143.66	2,845,923.11	3,745,590.05
Milling ores	18,075.018	373,643.78	862,755	1,115,481.21	1,489,124.99
Total	184,802.933	3,820,215.66	11,319,860.07	14,635,778.66	18,455,994.32

ORIGIN BY PERCENTAGES OF THE GOLD AND SILVER PRODUCTION IN UTAH DURING THE CALENDAR YEAR 1901.

Origin.	Gold.	Silver.
	<i>Per cent.</i>	<i>Per cent.</i>
Quartz and dry ores	3.62	7.52
Cyanide mill bullion	53.45	.42
Lead ores	9.59	64.99
Copper ores	23.55	19.44
Milling ores	9.79	7.63
Total	100	100

PRODUCTION OF COPPER AND LEAD IN UTAH DURING THE CALENDAR YEAR 1901.

Summary, by counties.	Copper.	Lead.
	<i>Fine pounds.</i>	<i>Fine pounds.</i>
Beaver	777,578	6,907,969
Juab	7,557,825	24,388,133
Salt Lake	14,422,361	2,754,779
Summit	2,477,080	60,232,236
Tooele	1,199,476	4,557,818
Utah		14,800
Wasatch	243,998	
Custom smelter, in addition to the above, not possible to distribute by counties	253,570	246,781
Total	26,931,888	99,102,516

DISPOSITION OF GOLD AND SILVER OF UTAH PRODUCTION DURING THE CALENDAR YEAR 1901.

Disposition.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
Deposited at the United States mints and assay offices	<i>Fine ounces.</i> 74,581.235	\$1,541,730.95	<i>Fine ounces.</i> 42,972.11	\$55,559.88	\$1,597,290.83
Shipped to custom smelters and refineries by producers...	110,221.698	2,278,484.71	11,276,887.96	14,580,218.78	16,858,703.49
Total	184,802.933	3,820,215.66	11,319,860.07	14,635,778.66	18,455,994.32

WASHINGTON.

By FREDERICK A. WING,

Assayer in charge of United States assay office, Seattle, Wash.

The output of precious metals from Washington for the calendar year 1901 is as follows:

Metal.	Quantity.	Value.
Gold.....fine ounces..	31,987.467	\$661,239.61
Silver (coining value) .....do....	377,381.17	487,927.16
Copper (at \$16.117 per hundredweight).....fine pounds..	29,520	4,757.74
Lead (at \$4.33½ per hundredweight) .....do....	216,841	9,396.44
Total.....		1,163,320.95

PRODUCTION OF PRECIOUS METALS IN WASHINGTON DURING YEAR 1901 COMPARED WITH THAT OF 1900.

Metal.	1900.		1901.	
	Quantity.	Value.	Quantity.	Value.
Gold.....fine ounces..	35,431.634	\$732,436.88	31,987.467	\$661,239.61
Silver .....do....	302,569.73	391,201.26	377,381.17	487,927.16
Copper.....fine pounds..	36,831	5,962.94	29,520	4,757.74
Lead .....do....	1,091,945	47,718.00	216,841	9,396.44
Total.....		1,177,319.08		1,163,320.95
Net decrease.....				13,998.13

The condition of the mining industry of the State might be stated as "about the same;" in fact, it is convalescent—slowly recovering from the depressing effect of the temporary diversion of capital to the more alluring Alaskan fields. While the actual production shows a slight decrease, the general condition of the industry may safely be considered improving, and the close of the coming season will show a betterment, not only in the way of development, but in a largely increased production. During the year just closed the Monte Cristo district has perfected permanent connection with the outside world again by the complete reconstruction of the Everett and Monte Cristo Railroad, which was destroyed by flood several years ago, and the mines at Monte Cristo were among the heaviest producers of the State for the season. To offset this gain, some of the producing mines in other sections were idle, awaiting transportation for their ores, or for the purpose of improving their plants, so that the average production has hardly held its own with the past season.

Republic, in Ferry County, has been very quiet. It seems to be the prevalent impression that the new mill built for the treatment of local ores has not met the requirements, and that has had a depressing effect on the camp as a whole, necessitating, as it has, the piling up of ore

on the dump to await the completion of the railroad now building into the district. By the early part of next season it is expected there will be an outlet to the smelter for the hundreds of tons of rich ore available, and will witness a revival of the industry at this point. That the district has remained wholly inactive is by no means the case, for much in the way of permanent development was accomplished all along the line.

In Stevens County the properties of the Cedar Canyon Consolidated Mining Company have been shipping continually since 1894, and report a large output for this season. The bulk of the silver and lead produced in Washington comes from Stevens County, and while the low prices prevailing for both silver and lead have had a depressing effect, causing the closing down of some of the old-time producers, others, notably the Deer Trail No. 2 and the properties of the Basin Mining Company, as well as those of the above-mentioned company, have kept steadily grinding away.

The districts situated in the upper end of Chelan County can safely be classed among the prosperous districts of the State when development and not production is being discussed, for much in the way of active work was done during the season on many of its promising properties. Rumors are rife of smelters to be built and railroads to be constructed, and actual work was begun in some sections along the banks of Chelan's magnificent waterway—Chelan Lake—notably at Railroad Creek, where they have some 10 miles of roadbed graded from the landing on the lake into the interior in the direction of the Holden properties. This portion of the State is undoubtedly rich in mineral wealth. Up on the Stehekin River are the Tiger, Minnesota, Cascadia, and others, on which considerable development work has been accomplished during the year, and over to the eastward, on the Methow, many of Okanogan County's best mines are situated, such as the Hidden Treasure and Highland Light, in Squaw Creek district. The placers of Meyers Creek district, over in the northeastern part of the county, have produced steadily during the season. Across the divide, to the north of Lake Chelan, are the rich districts of Mount Baker and Slate Creek; to the west, Monte Cristo, Sultan, Index, and Stillaguamish, covering an area of many miles square that is rich in gold, silver, copper, and lead, presenting as inviting a field for investment of capital as can be found on the Pacific coast. Go south on the Cascade Range as far as the southern boundary of the State, and in every portion large mineral deposits have long been known to exist in paying quantities, only awaiting the investment of capital judiciously expended by practical men. In Clark County large ledges of copper-bearing ore are claimed to have been uncovered that bid fair to rival the wonderful mines of Butte. The placers of the Swauk, in Kittitas County, were large contributors during the season. The producing mines reporting are as follows:

ASOTIN COUNTY.

Valley Queen placers, Snake River district.

CHELAN COUNTY.

Warrior General Mining Company, Peshastin district.

PIERCE COUNTY.

Republic, California, Lone Pine Surprise, Morning Glory, and Quilp mines, in the Eureka district; and American Mining Investment Company, Curlew district.

KITTITAS COUNTY.

Bigney mine, Cascade Mining Company, J. C. McCauley, G. B. Henton, and P. McCallum, all placers, in the Swauk district.

OKANOGAN COUNTY.

Mary Anne Creek placers, Cracker Jack, Eureka, Emma, and Torpedo placers, in the Meyers Creek district.

SNOHOMISH COUNTY.

Index Mining Company, Index district; Monte Cristo Mining Company, Monte Cristo district; Forty-five Consolidated Mining Company, Wallace district.

STEVENS COUNTY.

Log Cabin mine, Springdale district; Eagle mine, Chewelah district; Deer Trail No. 2, Elephant, and Silver Seal mines, in Cedar Canyon district.

WHATCOM COUNTY.

Eureka and Mammoth mines, Slate Creek district.

PRODUCTION OF GOLD AND SILVER IN WASHINGTON (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1901.

Origin.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Placer	4,953	\$102,387.59	998	\$1,290.34	\$103,677.93
Quartz	27,028.467	558,727.99	328,679.17	424,958.92	983,686.91
Copper ores	6	124.03	1,464	1,892.85	2,016.88
Lead ores			46,240	59,785.05	59,785.05
Total	31,987.467	661,239.61	377,381.17	487,927.16	1,149,166.77

BULLION OF WASHINGTON PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1901.

Institution.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
	<i>Fine ounces.</i>		<i>Fine ounces.</i>		
Mints:					
Philadelphia	81.141	\$1,677.33	38.31	\$49.53	\$1,726.86
San Francisco	2,093.479	43,276.05	231.13	298.83	43,574.88
Assay offices:					
Boise	195.850	4,048.58	36.16	46.75	4,095.33
Denver	25.950	536.43	5.91	7.64	544.07
Helena	1,487.560	30,750.59	436.72	564.65	31,315.24
New York	14,758.391	305,083.02	7,542.86	9,752.38	314,835.40
Seattle	3,265.526	67,504.41	912.60	1,179.93	68,684.34
Total	21,907.897	452,876.41	9,203.69	11,899.71	464,776.12

DISPOSITION OF GOLD AND SILVER OF WASHINGTON PRODUCTION DURING THE CALENDAR YEAR 1901.

Disposition.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
Deposited at the United States mints and assay offices	<i>Fine ounces.</i> 21,907.897	\$452,876.41	<i>Fine ounces.</i> 9,203.69	\$11,899.71	\$464,776.12
Shipped to custom smelters and refineries by producers ..	10,079.570	208,363.20	368,177.48	476,027.45	684,390.65
Total	31,987.467	661,239.61	377,381.17	487,927.16	1,149,166.77

DEPOSITS OF GOLD BULLION AT THE UNITED STATES ASSAY OFFICE, SEATTLE, WASH., DURING THE CALENDAR YEAR 1901.

Source.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Value.	
	<i>Standard ounces.</i>		<i>Standard ounces.</i>		
Alaska	185,885.707	\$3,458,338.74	15,829.91	\$18,420.26	\$3,476,759.00
Colorado	8.953	166.56	.90	1.05	167.61
Idaho	300.279	5,586.59	72.41	84.26	5,670.85
Montana	5.818	108.24	.89	1.03	109.27
Oregon	260.101	4,839.09	56.31	65.52	4,904.61
Washington	3,628.362	67,504.41	1,014	1,179.93	68,684.34
British Columbia.....	33,245.748	618,525.54	7,865.99	9,153.15	627,678.69
Ontario.....	11.688	217.45	1.91	2.22	219.67
Yukon Territory	587,878.411	10,937,270.40	137,369.63	159,848.29	11,097,118.69
Mutilated domestic gold coin	5.854	108.91			108.91
Foreign gold coin	198.439	3,691.89	.35	.41	3,692.30
Jewelry	255.478	4,753.08	72.71	84.61	4,837.69
Total	811,684.838	15,101,110.90	162,285.01	188,840.73	15,289,951.63
Redeposits	14.258	265.27	4.42	5.14	270.41
Grand total.....	811,699.096	15,101,376.17	162,289.43	188,845.87	15,290,222.04

WYOMING.

By FRANKLIN R. CARPENTER, Ph. D., F. G. S. A.,

Mining and Metallurgical Engineer.

I append herewith figures on the gold and silver output of the State of Wyoming for the year 1901. I regret exceedingly that reports for Wyoming are extremely unsatisfactory and that the final figures are lower than the estimates sent you last January.

	Fine ounces.
Gold	2,000
Silver	25,000

Practically all of the silver was from refractory ores, and all of the gold from free-milling ores, placer, etc., save about 300 ounces from the copper ores of the State, from which the silver also came.

The owners of these mines are extremely reticent about furnishing any information.

PART II.

PRODUCTION OF GOLD AND SILVER IN FOREIGN COUNTRIES.

PRODUCTION OF GOLD AND SILVER IN FOREIGN COUNTRIES.

[Arranged geographically.]

NORTH AMERICA.

BRITISH NORTH AMERICA.

It is learned from the report of the geological survey of Canada that British North America during the calendar year 1901 produced gold to the value of \$24,128,503, of which \$18,000,000 worth is ascribed to the Yukon. This valuation would represent 1,167,216 fine ounces, which is 181,504 ounces, or 13+ per cent less than the product of the preceding year. The falling off was chiefly in the Yukon, where it amounted approximately to \$4,275,000, which was partly compensated by a gain of about \$600,000 in British Columbia.

The progress of gold mining in Canada since the discovery of gold in the Yukon is shown in the following table:

Year.	Value of annual product.	Increase (+) or decrease (−) compared with preceding year.	
		Value.	Per cent.
1897.....	\$6,027,016		
1898.....	13,775,420	+\$7,748,404	128
1899.....	21,260,437	+ 7,485,017	54
1900.....	27,880,518	+ 6,620,081	31
1901.....	24,128,503	− 3,752,015	13

ANNUAL PRODUCTION OF GOLD IN CANADA.

Calendar year.	Fine ounces.	Value.
1887.....	57,465	\$1,187,804
1888.....	53,150	1,098,610
1889.....	62,658	1,295,159
1890.....	55,625	1,149,776
1891.....	45,022	930,614
1892.....	43,909	907,601
1893.....	47,247	976,603
1894.....	54,605	1,128,688
1895.....	100,806	2,053,674
1896.....	133,274	2,754,774
1897.....	291,582	6,027,016
1898.....	666,445	13,775,420
1899.....	1,028,620	21,261,584
1900.....	1,348,720	27,880,518
1901.....	1,167,216	24,128,503

(Calculated from the values at the rate of \$20.67 per ounce.)

The production by Provinces, according to Mr. Robert Bell, acting director of the geological survey of Canada, was as follows:

Nova Scotia	\$546, 963
Quebec	3, 000
Ontario	244, 837
Northwest Territories:	
Yukon district	18, 000, 000
Saskatchewan River	15, 000
British Columbia	5, 318, 703
Total	24, 128, 503

SILVER.

The silver production in 1901 was 5,596,133 ounces, of the commercial value of \$3,357,680 and the United States coining value of \$7,235,403. Compared with the previous year's yield, this was a gain in quantity of 1,147,378 ounces, or 25.8 per cent, but owing to the fall in the price of silver the gain in value was less, namely, 15 per cent.

PRODUCTION OF SILVER IN CANADA IN 1901, BY PROVINCES.

Province.	Weight.	Commercial value.	United States coining value.
	<i>Ounces.</i>		
Nova Scotia			
Quebec ^a	58, 400	\$35, 040	\$75, 507
Ontario	141, 389	84, 830	182, 805
Saskatchewan River			
Yukon ^b	235, 000	141, 000	303, 838
British Columbia	4, 807, 908	2, 884, 745	6, 216, 285
Total	5, 242, 697	3, 145, 615	6, 778, 435

^a Figures for 1900 repeated.

^b Estimated.

ONTARIO.

According to the report of the bureau of mines of Ontario, that Province in 1901 produced 14,293 ounces of gold of the value of \$244,443 (this figure varies slightly from that given by the geological survey of Canada) and 151,400 ounces of silver, worth \$84,830.

The results so far attained in mining for gold in Ontario have not been commensurate with the expectations which were entertained some years ago, when the discovery of gold over very extensive tracts in the northwestern portion of the Province gave rise to unbounded hopes.

Many of the conditions are favorable; the auriferous material is mostly free-milling quartz amenable to the ordinary processes of stamping and amalgamation with chlorination or cyanidation for concentrates; there is abundance of water, plenty of wood, and no scarcity of labor. Many of the veins are of good size, some of unusual magnitude, and there are no royalties or other undue burdens to be borne by the industry. As yet there has been but little deep gold mining in Ontario, and workings up to the present time scarcely afford sufficient grounds for generalization. In a few of the mines irregularities have developed below ground in the course and location of the payable ore chutes as well as in the veins themselves, and the conclusion has been reached that the gold ores of north and west Ontario are in the main low grade and can not be expected to yield large profits unless economically worked on a considerable scale. Low-grade propositions, however, are not necessarily undesirable, and where other conditions are propitious, are indeed by many preferred to rich "specimen" mines.

GOLD IN PLACER DEPOSITS.

Fine gold was discovered in 1896 in gravel along the banks and in the valley of the Vermilion River, and an examination of the deposits was made in the spring of the following year by Mr. Arthur H. Gracey, whose report was published in the annual volume of the bureau of mines for 1897. Mr. Gracey found the auriferous gravel widely disseminated in the basins both of the Vermilion and Wahnapiatae rivers and also on the banks of Lake Onaping, but the gold was mostly in fine colors and the average value of the gravel low, not more than a few cents per cubic yard. Richer deposits were found carrying as much as 50 cents or \$1 per cubic yard, but on the whole the beds appeared to be too low in gold contents to admit of profitable working, at any rate by hand, and ordinary hydraulic methods were precluded, a sufficient head of water not being obtainable on the rivers. A closer investigation was made of these placer gravels by Dr. Coleman, whose account was printed in the bureau's report for 1900, and who found them to extend much farther north than the area examined by Mr. Gracey. More or less work had been done by prospectors during the intervening years, and it was therefore possible for Dr. Coleman to form some opinion as to the value of the field as a whole. The conclusion at which he arrived was that, the gold being very fine and apparently nowhere concentrated in deposits which could be worked by hand, the scope for profitable operations was limited. It would probably be found, Dr. Coleman thought, that only the gravels from Meteor Lake on the height of land southwest to "Dawson City" on the Vermilion were deserving of attention, the beds over this stretch extending along the river for 40 miles and having a breadth of a mile and sometimes of 2 or 3 miles. He agreed with the suggestion made by Mr. Gracey and others that the most promising method of treating the gravels was by dredging, for which the conditions were eminently suitable, provided the gold contents proved to be sufficient. As to the origin of the gold, Dr. Coleman regarded the quartz veins or stringers in the Huronian rocks to the northeast and north as the most probable source, and deemed it likely that the auriferous gravel had been brought a considerable distance, probably by glacial action.

During the past year Mr. Robert H. Ahn, of Toronto, has been experimenting with these gravels with the view of recovering the gold by a combined amalgamation and cyaniding process. A small plant was erected on the banks in Hammer Township, which, according to Mr. Ahn's statements, has proved the practicability of his method. The gravel is first screened down to about one-fourteenth of the original bulk, this residue containing all the gold obtainable without crushing. The remainder of the treatment is thus described by Mr. Ahn:

"The fine pulp, or the one-fourteenth, is pumped into tanks of special filtering construction, which are situated at a central treating station located on shore. From these tanks the pulp is drawn in a fairly dry state and charged into an amalgamating barrel, in which there is a large, heavy, copper-covered roller lying loose in the bottom of the barrel. As the barrel revolves the roller revolves also, rolling the ore under itself, and thus subjecting the pulp to amalgamation under pressure, care being taken that only enough mercury be added to take up the amount of gold in the pulp.

"As the ore is fed into the barrels, which, by the way, are so constructed as to allow of a continuous feed and discharge, it is further moistened by a charge of cyanide solution, which not only assists in amalgamating the coarser particles of gold, but at once attacks the finer portions of gold, and, owing to the agitation and splash which takes place inside the barrel, the cyanide is greatly assisted in its work by the absorption of the necessary amount of oxygen.

"As the pulp leaves the amalgamating barrel it is received into a launder and conveyed to concentrating tables, where all the black sand and rusty gold that may have escaped from the barrel is separated from the main portion of the pulp. The black sand is conveyed to separate tanks, where it undergoes a further cyanide treatment, by which means all the values are extracted. The pulp is conveyed to receiving tanks constructed on the same principle as the first receiving tank. Here the cyanide solution is filtered off; and if it is rich enough in gold, it is passed through the precipitation or collecting boxes, which may be of any approved construction or method."—(R. H. Ahn in *Engineering and Mining Journal*, New York, March 1, 1902.)

Deposits of gold-bearing gravel, apparently somewhat similar in character to those of the Vermilion River, were discovered last year on a large body of water known as Savant Lake, north or northeast of Sturgeon Lake, where gold exists in quartz veins and in dikes, and about 120 miles north of Ignace Station, on the Canadian Pacific Railway. Ignace is about 150 miles west of Port Arthur. The gravel beds are described by Mr. Alan Sullivan, C. E., who made a hasty examination of them in the summer of 1901, as extending over at least a length of 6 miles and a breadth of

1 mile, the average value of the gravel within this area, as shown by numerous pannings from the surface, being about 8 or 10 cents per cubic yard. A number of islands which run in a range down the middle of the lake are entirely of gravel and vary in height from 25 to 100 feet. Mr. Sullivan states that he did not reach bed rock in any place, and therefore can not say whether there is any concentration of value at that point. The gold is not light and flaky, but in small rounded particles, and large boulders are conspicuously absent. It is possible some further investigations may be made of this region during the present year.

GOLD AND SILVER MINES.

In eastern Ontario the larger properties have continued in active operation with the addition of another producer, and of the smaller mines several have shut down either partly or in whole for a period.

At the gold-arsenic mines the situation has altered only in that the Atlas Arsenic Company has suspended work while negotiations for the amalgamation of the various arsenic interests in the district are under way. Along the southeastern shores of Lake Wahnapiatae, about 20 miles northeast of Sudbury, the finding of a number of auriferous quartz veins with the extensive developing of one of them is arousing interest in this new prospective gold district, of which, however, no account in this report is possible, owing to its inaccessibility during the early spring months. In the Michipicoton mining division the Grace mine has become the chief representative of the gold industry by developing into what will no doubt shortly be a producing mine.

Some of the old locations in the southern part of western Ontario, now reached by the Ontario and Rainy River Branch of the Canadian Northern Railway, have taken on a new lease of life with a vim which ought to show their worth pretty thoroughly, and there are also the usual quota of prospects here, as well as in the district farther north, which have had to shut down or remain idle. In the Sturgeon Lake region all the properties appear to be showing up well under the steady development of the last two years or more, two of them producing bullion for a time at their small milling plants. Of the northwestern districts, the Manitou is much the more active for its extent, boasting one producing mine and a number of others rapidly advancing to that stage. The Lake of the Woods, however, brings forth several important new discoveries of auriferous deposits, some undergoing systematic development, together with the reinstatement of the Black Eagle or old Regina mine in the front rank of producers in the Province; but the two largest mines, the Sultana and Mikado, have been unable to maintain their accustomed output during the past year or more, although the prospects for continued life are still good.

The Victoria silver mine, near Sault Ste. Marie, while in operation for a few months last year, increased the silver output slightly. The mines of Port Arthur district, however, now form the only producers. By a recent amalgamation of the different interests operating in this field a comprehensive plan of joint development and treatment has begun.

BRITISH COLUMBIA.

The following data regarding the production of the precious metals in British Columbia are taken from the annual report of the minister of mines for that Province.

Statistics show that the gold production of the Province, including both placer and lode gold, for 1901, amounted to \$5,318,703, which is an increase over 1900 of \$586,598, which is equal to nearly 13 per cent. This is the greatest gold production British Columbia has ever made. The product was obtained from placer mining, including ordinary placer work, hydraulic methods and dredging, and from lodes.

The placer yield for the year was \$970,100, a decrease compared with that of 1900 of \$308,624, which is accounted for by the fact that there was a marked falling off in the Atlin district, the ordinary placers being worked out and the hydraulic companies having gotten into litigation among themselves and with individual mines, so that the season was practically lost.

The Cariboo district likewise showed a decreased production, owing to lack of water.

Dredging operations thus far have not yielded very large returns, although considerable capital has been invested in this form of mining. Gold exists in the beds of many of the rivers, but the difficulty seems to be to save it.

It is to lode mining that the Province is indebted for its ever-increasing gold production. In 1901 the lode mines of the Province yielded \$4,348,603 in gold, an increase over the previous year of \$895,222, or 26 per cent. The increase for the last three years—1901, 1900, and 1899—has been, respectively, 26, 21, and 30 per cent, an exceedingly rapid development. Approximately this gold was derived from—

Direct smelting of copper-gold ores	\$3, 474, 738
Combined amalgamation and concentration	873, 865
Total	4, 348, 603

It may be said that no absolutely “free-milling” gold property is working in the province. They all carry sufficient value in sulphides to necessitate the saving of such.

SILVER.

The total amount of silver produced in 1901 was 5,151,333 ounces, valued at \$2,884,745, an increase over the previous year of \$575,545. Silver in British Columbia is derived from silver-lead ores and from copper ores carrying silver, with a small percentage of “dry” silver ores. In 1900 approximately 90 per cent of the silver produced was derived from silver-lead ores, probably including most of the “dry” ores, as they were chiefly smelted together and can not be separated for statistical purposes. This year there has been a falling off in the production of lead ores and a consequent diminution of the silver production, which has, moreover, been more than offset by the greatly increased tonnage of the copper-silver ores.

As near as can be estimated, the copper-silver ores have this year produced 30½ per cent of the silver output. The production from “dry” ores, although proportionately small, has greatly increased, but it is impossible to separate the amount derived from this source.

British Columbia, up to and including 1901, has produced gold and silver as follows:

Placer gold	\$63, 555, 543
Lode gold	17, 161, 463
Silver	16, 534, 554

BRITISH COLUMBIA.

VANCOUVER ISLAND MINES AND PROSPECTS.

[WILLIAM M. BREWER, in the Engineering and Mining Journal, New York, December 28, 1901.]

Recently the writer visited the Mount Sicker and the Alberni Canal mining districts, on Vancouver Island, in order to observe the results of the operations carried on during the past season.

Mounts Sicker and Brenton, which are separated by the Chemainus River, are located within a few miles of Horseshoe Bay (Chemainus Harbor), Osborne and Maple bays, on the east coast of Vancouver Island.

Discoveries of copper-gold ores were first made near the summit of Mount Sicker in 1897, when the Lenora mineral claim was located. Later followed the location of the

Tyee claim, adjoining the Lenora on the east; the Key City, Victoria, Copper Canyon, and Susan, to the west of the Lenora, with the Key City adjoining that claim, and the others situated in the order named. The boundaries of these claims east and west embrace all the ground 1,500 feet wide from the extreme summit of Mount Sicker across the Chemainus River almost to the summit of Mount Brenton, and present at the present time the productive portion of the district. A large number of other claims have been staked and partially prospected north, south, east, and west from those designated by name.

The district is within the boundaries of the land grant made some years back to the Esquimalt and Nanaimo Railroad, consequently locators of mineral claims are compelled to obtain from that corporation a title to the surface and base metals, as well as Crown grant from the provincial government covering the precious metals. As long as the company adheres to its present policy of issuing deeds on payment of \$5 per acre which convey title to the surface, timber, and base metals the cost for perfect titles to surface and all minerals does not exceed the cost for Crown grants to mineral lands in other portions of the province outside of this belt, because the law is that Crown grants issued to mineral claims after the requisite \$500 have been expended in development work and survey do not convey surface rights other than to erect necessary buildings and the right to mine.

In order to secure perfect title to the surface and timber an additional payment of \$5 per acre must be made. The only difference between obtaining a perfect title to a mineral claim situated within the railway belt on Vancouver Island and without that belt is that in the former the surface right must be secured, but in the latter it may be.

As a matter of fact, it is a very rare occurrence that the additional \$5 per acre is ever paid to the province, because the surface of a mineral claim is rarely, if ever, of sufficient value, unless for town-site purposes, to make it worth while to pay the extra amount to secure the surface.

The railway belt on Vancouver Island embraces practically nearly all of the eastern portion of the island, which includes all the productive coal lands, but only a comparatively small proportion of the lands carrying other minerals. These occur chiefly outside of the railway belt and on the western side of the island.

As the writer has already explained in previous articles on the mineral resources of Vancouver Island, there is a decided difference between the geology of the eastern portion of the island and the western, especially north from the Mount Sicker district, which is situated about 50 miles northerly from Victoria. Sedimentary rocks, including the coal measures, occupy most of the eastern portion north from Mount Sicker, while igneous and metamorphic rocks, including large areas of crystalline limestone, make up the western and southern portions.

The Mount Sicker district may be considered to occupy a position almost at the line of demarcation between the sedimentary rocks and the crystalline area. A zone of schist occurs extending from Maple Bay, on the east coast, through Mount Sicker and Brenton toward the west coast an undetermined distance. The line of strike is nearly due east and west. The width of the mineralized zone, so far as at present known, is about 1,200 feet, and if it maintains its continuity to the west coast it should cross the Alberni Canal near its entrance to Barclay Sound. But instead of doing this the zone apparently wedges out near Cowichan Lake, while another zone of schistose rocks, very similar to those of the Mount Sicker region, occurs on China Creek, about 12 miles from the head of Alberni Canal.

On Mount Sicker there is one feature connected with the mineralized zone which deserves attention. It is, that on the northern boundary of the schist a well-defined, persistent ledge of hungry-looking quartz occurs. This has up to the present time marked the northern limit of the local occurrences of ore, the southern limit being as equally well defined and marked by a dike of porphyritic rock, which, at the contact between it and schist, has a peculiar appearance and resembles a body of dirty brown melted gutta-percha with white nodules as impregnations through it. When struck with a pick or drill this material is found to be a soft, but spongy, like india rubber. Its thickness varies from a few inches up to 2 feet, and when exposed to the air it slacks and breaks up like shale. This material has been noticed by the writer in the underground workings of both the Tyee and Lenora mines, but has not been noticed on the surface, although he is informed that it can be found at some points marking the contact.

The character of ore occurring in the zone of schist is chalcopyrite with an iron pyrite, the latter being chiefly marcasite, while sometimes pyrrhotite also forms a portion of the ore body. The gangue is principally silica, sometimes massive quartz, at others siliceous schist. But often the ore is a solid mixture of chalcopyrite and iron pyrites of considerable thickness, even reaching fully 30 feet in some portions of the workings and maintaining that thickness for considerable length.

During the writer's recent visit he was permitted by the management to examine the underground workings of the Tyee mine, adjoining the Lenora on the east, but was not allowed the privilege of examining the underground workings of the latter.

The shipments of first-grade ore from the Lenora, which have been almost continuous since 1899, have established a reputation for the camp second to none on Vancouver Island. The total shipments to date, as estimated by the writer, must have been about 25,000 tons, while about the same tonnage of second-grade ore remains on the dump awaiting the erection of a local smelter. The ore shipped has carried about \$20 per ton in all values, some of it even having yielded higher values. In order to facilitate shipments, the management of the Lenora company has built a narrow-gauge railroad from the mine to connect with the Esquimalt and Nanaimo Railroad, about 7 miles distant, and is at present extending this line to Osborne Bay, on the east coast of the island, about 4 miles beyond the junction with the main line.

TYEE MINE.

This property has been opened to a depth of 235 feet by two vertical shafts. One of these shafts was sunk for prospecting, but when the present owner, the Tyee Copper Company, commenced extensive development the management installed heavy hoisting machinery and air drills and commenced sinking a new two-compartment shaft. This is now down to the 235-foot level, and sinking has been continued to open up another level 100 feet deeper. The policy of this company has been to block out ore in sight and thus ascertain the capacity of the mine previous to either shipping or erecting a smelter to treat the ore.

A station has been opened on the 100-foot level where the ore body has been cross-cut and drifted on, showing a body of ore with a maximum thickness of about 30 feet and continuous an undetermined length beyond about 75 feet. To the height of one set of timbers this ore has been mined to the dimensions given, leaving both faces along the strike solid ore. It is claimed by the management that this body of ore is continuous to within 40 feet of the surface above the 100-foot level, and from the writer's investigations he is of the opinion that it maintains continuity to within about 20 feet of the 235-foot level.

On that level he found that drifting and crosscutting had failed to expose any body of ore of commercial value under the body opened on the 100-foot level, but upraising from the lower level from 15 to 20 feet had exposed the ore body, thus clearly showing that it had lenticular structure and that probably sinking another 100 feet would open up another lense at about the point where it reached its maximum thickness. Crosscutting toward the north on the 235-foot level exposed a vein of pyritous quartz ore carrying chiefly gold values.

This is about 30 inches thick where crosscut, and has been drifted on about 50 feet. The average values are, from information from the management, about \$20 per ton, but samples yielding values as high as \$500 per ton have been taken from the vein. The same vein, the writer was informed, also occurs on the Lenora ground. The strike and dip are conformable with the country rock, striking nearly true east and west and dipping about 80° south. This vein occurs in the same schist as the main body of copper-gold ore. Recently a sample shipment of 200 tons of copper ore has been made from the Tyee to the Tacoma smelter. The average assay value of this is 8 per cent copper and \$5 in gold.

Following the zone of mineral-bearing schist toward the west, the Lenora, Key City, Victoria, Copper Canyon, and Susan mineral claims are crossed by the Chemainus River, flowing along the boundary between the Victoria and Copper Canyon claims from south to north.

The Lenora mine is employing about 100 men and shipping 50 to 60 tons of ore daily; sometimes the shipments, it is claimed, have reached 100 tons. This mine has been a steady producer for three years past, the production having increased as the facilities for shipping have been improved, from a wagon road to a tramway and from the latter to the present narrow-gauge railway. The mine has been opened with a series of drift tunnels, the lower or third one being run at a level about 300 feet below the outcrop. The stopes on the second level are about 70 feet from the Tyee west line.

This property has been one of the few propositions which have really paid from grass roots. In fact, the purchase price, cost for building wagon road, tramway, and railroad, as well as expenditure for all work in the mine, have been already taken from the mine itself, while some 25,000 or 30,000 tons of second-grade ore still remain on the dump. The extent of the ore reserves is unknown to the writer, but it is reported on reliable authority that Messrs. Breen & Bellinger, formerly of Northport, propose erecting a 300-ton smelter at the water-front terminus of the narrow-gauge railroad on the strength of the future possibilities of the Lenora mine and Mount

Sicker district. Therefore, it would appear that these gentlemen had satisfied themselves with regard to ore contracts before having decided on erecting the smelter.

On the Key City claim a limited amount of development has been performed, but this has not shown very satisfactory results up to the present time; in fact, no well-defined outcroppings have been discovered to date between the Lenora outcrop and the Victoria claim.

On the Copper Canyon group, which includes the Victoria, Copper Canyon, and Susan claims, with some fractions, outcroppings of iron capping carrying chalcopyrite and marcasite are found on each of the claims. The most easterly of these outcroppings is on the Victoria, about 500 feet above the Chemainus River, where three parallel ledges occur carrying ore. These have been exposed by open cuts, and at the time of the writer's visit a tunnel was being run to intersect these at a depth of 50 or 75 feet below the outcrops.

This tunnel is being run in schist, crossing the formation diagonally. During the progress of the work a ledge carrying ore was exposed, crosscut diagonally, and left to the north of the tunnel. The management propose crosscutting from the present face of the tunnel 150 feet in, in both directions, north and south, to determine the conditions under the outcroppings. The schist is all more or less mineralized with marcasite, which toward the face, where the schist becomes more siliceous, shows every indication of giving place to chalcopyrite. This is generally characteristic of the Mount Sicker mineral zone wherever systematic work has been done.

Other outcroppings on the Copper Canyon occur at the river; also on the Susan claim about 600 feet above the river on the side of Mount Brenton. Several tunnels and open cuts have been made on each side of the river, exposing bodies of chalcopyrite associated with marcasite and quartz gangue. In the bed of the river itself the writer examined a zone about 50 feet wide, which is highly mineralized, and as this crosses the stream it would appear probable that when crosscut at points beyond the action of the leaching process from surface waters a body of pay ore would be exposed. This group of claims is most advantageously situated as regards economical working, because the east line of the Victoria claim is 900 feet above the level of the river, while the west line of the Susan claim is 1,200 feet above the same level. The group takes in 4,700 feet along the line of strike of the mineral-bearing zone and 1,500 feet in width.

The river will furnish ample water power to run all the mining and lighting machinery for the entire district. A survey for a railroad having a $2\frac{1}{2}$ per cent grade has been made from Chemainus Harbor up the river, passing across the Copper Canyon claim from north to south on a flat which would be well adapted for town-site purposes.

As the tendency is in future to prospect west from the Susan claim rather than east from the Tyee mine, the advantageous situation of such a line of railway with a town site on the Copper Canyon claim easily accessible to the river presents itself very forcibly to any disinterested visitor to the district.

To the west from Mount Brenton is situated Cowichan Lake. Whether the same geological and mineralogical conditions prevail in the region adjacent to and on the north side of the lake as in the Mounts Sicker and Brenton districts is at present unknown, because but very few prospectors have penetrated into that territory, and no discoveries of the occurrence of mineral have been reported, but on the south side of the lake and toward its head a discovery of galena ore was reported during the past summer by Mr. H. S. Smith, of Duncans, who was the discoverer of the Lenora mine. This is in the vicinity of the head waters of the Gordon River, which empties into the Straits of Juan de Fuca at San Juan Harbor, on the southwest coast of Vancouver Island.

Previous to the present year reports of discoveries of galena on the Gordon River have been circulated, but the location was remote from any trails and very difficult to reach. The country between San Juan Harbor and the head of the Gordon River is heavily timbered, mountainous, and for the most part unexplored except at some points close to the river.

The discoveries reported on the south side of Cowichan Lake are not so inaccessible, because there is a good wagon road from Duncans Station on the Esquimalt and Nanaimo Railroad to the foot of the lake, where a summer resort is situated. From this point to within a short distance of the occurrence of the mineral claims the lake itself affords an excellent route to travel. It is quite possible that the head waters of the Gordon and Nitinat rivers will be prospected during the season of 1902 from this route rather than by following up those rivers from the west coast of Vancouver Island, as has been the custom heretofore. The country to the west between Mount Brenton and the Alberni Canal, and to the north between Cowichan Lake and Nanaimo Lake is at the present time unknown and unexplored. Near the latter lake some locations of mineral claims yielding copper-gold ore have been reported.

These are at present remote from transportation facilities and must await the building of wagon roads at least before extensive development can be attempted.

The Alberni Canal district has naturally received more attention than any other portion of the island because it has a water route some 40 miles in length from Barclay Sound, on the west coast, to the head of the canal, where is located a settlement composed of mining men, farmers, and Indians, which is the most thickly populated and important on the western side of the island.

Prospectors have quite thoroughly explored the country adjacent to the canal and the streams emptying into it. But even in this district the interior has received but little attention, the difficulties attending travel into the interior through almost impenetrable forests, across high, rugged mountains, to say nothing of the obstacles to be overcome in constructing tramroads or other means for transporting ore (should any of commercial value be discovered) to the coast have, up to the present time, apparently, been considered almost insurmountable. The general opinion has prevailed that previous to attempting such a difficult task it was advisable to await the results of the development work being done on the mineral claims within easy reach of salt water. This waiting game has been going on now, so far as lode mining is concerned, since 1897, when the first real excitement following the discoveries of good grade copper-gold ores and high grade gold-bearing quartz manifested itself, until the present year. More activity has been in evidence in the Alberni district during 1901 than since the commencement of lode mining.

The Thistle mineral claim, near the head of China Creek, was purchased by San Francisco people during the summer, and a large force of men employed to build a wagon road and do other necessary work previous to installing machinery and beginning systematic deep development work on the mine itself.

The writer has never seen this property, so can not speak from knowledge as to its possibilities of value. In 1898 it was bonded by Mr. G. A. Kislingbury, representative for the De La Mar interests in Mercú, Utah, and after some \$6,000 had been expended was turned down. The original owners later pushed the work of development beyond the point where Mr. Kislingbury suspended operations, and the results were sufficiently satisfactory for the San Francisco syndicate to pay \$15,000 cash for the claim and start up work, as referred to.

On the Golden Eagle, in the same vicinity, work has been carried on continuously since 1898 with a limited force of miners, who have been driving a long crosscut tunnel to intersect an ore body indicated by outcrops and building a wagon road to the claims. This location has not been visited by the writer; therefore he is not prepared to discuss the merits of the proposition.

The backbone of the entire district has been the Three Jays, or Hayes group of mineral claims, owned by the Nahmint Mining Company, because ever since the property passed out of the hands of the original locators systematic development work has been carried on with the expressed intention of blocking out ore in sight and determining the capacity of the mine before attempting to ship ore to the smelters. During the spring of 1900 the writer visited this property, and a description of the workings was published in the columns of the Engineering and Mining Journal. He has again visited the camp recently and found so much additional work had been performed and was in progress that he deems it advisable to give briefly the impressions produced by his second visit to the property.

At the time of his first visit, over a year ago, there had been done about 2,000 linear feet of work, consisting mainly of drifts and crosscut tunnels; but up to the present time the total development reaches 4,000 linear feet of underground work, while the surface improvements have been increased by the installation of a compressor plant, an aerial tramway nearly a mile in length, bunkers, and additional wharf accommodations.

In addition to installing surface improvements referred to, which will provide for a shipping capacity of 200 tons of ore daily, the management some time since commenced driving a crosscut tunnel, 8 by 6 feet in dimensions, on a level 425 feet lower than No. 2 tunnel, which is about 250 feet below the apex of the outcroppings. It is calculated that this lowest tunnel will have to be driven about 700 feet before any of the ore bodies developed in the upper workings will be intersected. Up to date this tunnel is in about 300 feet, and the latest reports are that bunches of ore have been struck already, while a zone which is apparently crossing the general trend of the known mineral-bearing zones has been exposed. The general trend of the ore shoots in the upper workings is nearly east and west.

In addition to being permitted to make a personal cursory examination of the workings of the Three Jays, the writer was given access to a report made by Mr. Chaster Lee for the management. This is a very exhaustive report, made after a long and thorough examination of the property. Mr. Lee gives the mine credit for 70,000 tons of ore in sight. He states that there are five known ore shoots within an

area of 240 by 380 feet, having their lines of strike east and west, and dipping about 80° to the south and pitching to the west. The ore zone is 5,000 feet long.

From 31 sets of analyses of the gangues of the first-class ore the average contents were 24.4 per cent iron, 6.3 per cent lime, and 24.8 per cent silica, showing an excess of lime and iron of 2.2 per cent.

The total measurement of the development work, previous to the driving of No. 3 or lowest tunnel, was as follows: Shaft No. 1, 146 feet deep; No. 2, 82 feet, with 17 feet of drifts; tunnel No. 1, with connections, 1,566 feet; No. 2, with connections, 1,713 feet; tunnel A, 56 feet; total, 3,580 feet.

In calculating the ore in sight Mr. Lee says he considered the width of the veins from the average from wall to wall where crosscut, and that the maximum allowance for ore not actually blocked out has been 25 feet beyond the actual faces exposed. By this method of measurement he has arrived at the following results as to first-class ore in sight:

Shoot.	Thick- ness (feet).	Cubic feet.	Tons (2,000 pounds).
No. 1	17	71, 775	8, 970
No. 2	15	307, 290	38, 410
No. 3	6	87, 168	10, 890
No. 4	5	73, 820	9, 200
No. 5	5	13, 750	1, 720
Total			69, 190

The average values per ton of this ore he gives in the following table, which he says has been arrived at from the results of a large number of assay tests:

Shoot.	Copper.	Silver.	Gold.
	<i>Per cent.</i>	<i>Ounces.</i>	<i>Ounce.</i>
No. 1	6. 90	0. 50	0. 035
No. 2	10. 20	. 60	. 020
No. 3	9. 03	1. 10	. 030
No. 4	7. 61	. 70	. 035
No. 5	8. 70	1. 02	. 044
Dumps (750 tons).....	11. 90	. 60	. 021
Average	9. 23	. 69	. 026

Of second-grade ore, he says, there are 2 shoots 25 feet wide, 240 feet long, and 50 feet high, containing 30,000 tons, which will yield an average value per ton of 2.58 per cent copper, 0.18 ounce silver, 0.015 ounce gold, and an additional ore zone 60 feet wide which yields about 1 per cent copper, with traces of gold and silver, per ton.

He estimates that the ore can be treated for about \$7 per ton if shipped, or for \$5.20 per ton in a local smelter. The cost for development work of all descriptions he places at \$8 per linear foot. The smelter returns for shipments already made for sample tests he gives at 13.27 per cent copper, 1.06 ounces silver, 0.032 ounce gold per ton.

* * * * *

MEXICO.

The United States ambassador to Mexico, Mr. Powell Clayton, states, basing his report upon official information received from the treasury department of Mexico, that in 1901 the Republic produced 15,475.2 kilograms of fine gold, worth \$10,510,000, at \$675.416 per kilogram.

It should be noted that this valuation of \$675.416 per kilogram is not the commercial value, which is \$664.60, but the amount with which persons who enter the precious metals are credited for gold. The credit for silver is \$40.915 per kilogram. These amounts are prescribed by law. (See the Mexican Financier of May 18, 1895—quoted in the report of the Director of the Mint for 1894.) At \$664.60 per kilogram the

product would be worth \$10,284,842. The total amount reported as exported and coined is \$10,384,392 (probably taken at \$675.416 per kilogram); the difference between this amount and the total production of \$10,510,000 is \$125,608, and this may be taken to represent the domestic industrial consumption.

The silver production for 1901 amounted to 1,793,692 kilograms, valued at \$73,388,909 pesos (at the Mexican coining value of \$40.915 pesos per kilogram); this represents a United States coining value of \$74,545,839 and a commercial value of \$34,600,319. In addition to the domestic production, silver to the amount of \$2,279,875 was imported to the United States, making a total of \$75,668,784; if from this the amount coined, \$21,821,900, and the amount exported, \$50,269,006, be deducted there is left a balance of \$3,577,878, representing the amount consumed industrially and the amount held.

Appended is a table containing this Bureau's estimate of Mexico's production of the precious metals from 1873:

PRODUCTION OF GOLD AND SILVER FROM THE MINES OF MEXICO, 1873-1901.

Years.	Gold.		Silver.	
	Weight.	Value.	Weight.	Coining value.
	<i>Fine ounces.</i>		<i>Fine ounces.</i>	
1873-1891	a 995,888	\$20,586,800	586,615,198	\$758,451,984
1895	290,275	6,000,000	46,971,407	60,719,500
1896	403,081	8,331,700	45,654,832	59,017,600
1897	362,812	7,500,000	53,913,139	69,693,000
1898	411,196	8,500,000	56,748,479	73,358,200
1899	376,927	7,791,770	50,395,125	65,145,000
1900	392,262	8,108,784	61,835,092	79,936,636
1901	497,521	10,284,842	57,656,549	74,545,839
Total	3,729,962	77,103,896	959,789,821	1,240,867,759

a From 1873 to 1876 the gold production of Mexico was included in Central and South America's product.

The figures for the years 1899 and 1900 are revised in accordance with those given in Mines and Quarries for 1900, which are quoted from the Boletín de Estadística Fiscal, Mexico, 1900, pages 193 to 201 (for 1899), and official returns furnished by the minister of finance for 1900.

It will be noticed that not until 1894 did Mexico's gold production become comparatively important and that it has rapidly increased since that time, the yield for 1901 having been the largest in its history. The average production during these seven years was 421,680 ounces, and the yield for 1901 exceeded this average by about 18 per cent.

Since 1873 the production of silver in Mexico has steadily increased, reaching the maximum in 1900. With the exception of this one year the yield for 1901 was the largest of any during this period of twenty-nine years, the average annual production of which was 33,382,699 ounces. The production of 1901 was, therefore, over 72 per cent in excess of the annual yield of this period.

THE ETZATLAN MINING DISTRICT, MEXICO.

[E. B. VON OSDEL, in The Engineering and Mining Journal, New York, February 15, 1902.]

The virtues of Mexico as a mining country have been thoroughly extolled and are well recognized by men of all countries. However, a word concerning a newly developed district may not be out of place.

No one who has traveled over the Mexican Central Railroad through the northern and western parts of the Republic can have failed to notice the lack of prominent peaks or lofty ranges. The mountains seem to be distributed along the plain in small groups, here and there, and are soon run down as we speed along. With a few exceptions such is the case along the line in the State of Jalisco. Leaving Guadalajara we are carried almost due west in general direction to the junction at La Vega, whence a branch runs north and west for a score of miles, climbs over a range of hills, and is at once in a beautiful basin surrounding Magdalena Lake and skirted by hills rich in the metals and filled with large haciendas and fertile ranches. On the southern side of the lake and on the foot of the adjacent hill is the town of Etzatlan, whose municipal records begin with its baptism of blood in 1521.

For two months the writer was stationed in this village of 7,000 people in connection with a smelting plant and mining interests. The Spaniards and Mexicans have gophered about in the hills for hundreds of years, and their prospect holes and dumps are everywhere over the hillsides. The resources of the country are thus opened up to a certain extent so that American capital, which is rapidly coming in, may get some idea of the wealth to be found here.

Sixty miles north of Etzatlan is the barranca of the Rio Grand de Santiago with the town of Hostotipaquillo lying halfway between. From Hostotipaquillo to the river is a district abounding in old silver mines which have been worked on a considerable scale. The veins are hundreds of feet in width, containing enormous quantities of medium grade ore, with stringers of a high grade quality. These mines are always accompanied by enormous dumps of low grade sortings, running from 5 to 15 ounces in silver per ton. The ores are mostly of a siliceous character, carrying some manganese, while galena, chalcopryite, and hematite are found in some quantities.

South of an east-and-west line through Etzatlan is a range of hills filled with every sort of ore, but with considerable zinc associated with many of them. Some gold is found in the district, but the values are mostly in silver, copper, and lead.

Feldspars abound in the region, while great porphyry dikes and beds of blue conglomerate with flinty dolorites are to be found in extensive masses. The ores are found mostly in feldspar with some quartz. Silver, as chloride, bromide, sulphide, and in the native wire forms, is abundant. Galenite, cerusite, bornite, chalcocite, chalcopryite, sphalerite, and native copper are found in large quantities. There are also plentiful deposits of hematite and calcite for flux. For treatment there are many amalgamation arrastres, a few stamp mills, and cyanide and hyposulphite leaching plants, but the prevalent mode of treatment is the patio process.

About five miles from Etzatlan in a southerly direction is the Santo Domingo mine. It has been worked for hundreds of years by various Spanish and Mexican parties, and is now in operation by the Compania Armonia. The rich ore from the mine is sent to smelters, while the medium grade is treated by the patio process in a mill situated half a mile up the nearest gulch from the town.

There are three of the picturesque old Mexican structures near Etzatlan. Two at the edge of town are not in operation. The grounds are laid out as a park, with walks set in patterns of different colored stones, with drives, and with permanently constructed waterways.

There are also several fragmentary structures for carrying on the process, using arrastres turned by mules for grinding, the settling being done by boys performing a stationary run in the tank of mud.

The Santo Domingo mill is situated in a large level plat in the gulch, the grounds being walled in with the building in the central part. Stalls and a yard for the mules occupy the upper end, while the patio settlers and concentrators work in the lower end. In the building is found a disintegrating overshot wheel of huge dimensions and a group of large arrastras. Lately two boilers, an engine, a crusher, a quartz mill and feeder, and two Bartlett tables have been installed. An office and storeroom are in close proximity and a large gateway and bridge lead over the creek. Above the gate are the words, "La Providencia, Julio 10, 1873," and on the building is the inscription, "Diligent in business, fervent in spirit, serving the Lord," both in English and Spanish. On the lower side of the main building are settling tanks, assay furnace, storerooms, hand concentrators, and quicksilver settlers, which are turned by mules, grouped around the patio.

Only a limited amount of ore can be carried down by the mules from the mine, so that running is intermittent. The crushing is done by a Dodge crusher and Bryan roller quartz mill, furnishing a 20-mesh product, which is carried out by a stream of water and settled in a series of three tanks. Forty tons of the remaining mud are shoveled out into a large pancake called a torta and a hot solution containing 150 kilograms of blue vitriol and 2,000 kilograms of salt and about 350 kilograms of mercury are added. The torta is mixed for seven days, six hours a day, by twenty mules,

with the addition, from time to time, of more mercury in 30-kilogram lots until a batea test shows free mercury. Usually about 500 kilograms mercury are required. When the torta is done it is shoveled into the settlers to remove the mercury and the tailings are settled in the tank to await concentration. About 85 per cent of the silver is recovered in this way and the cost is between \$7 and \$8 per ton Mexican money. With the old arrastre for grinding the cost was \$11 per ton.

The ore carries 12 to 15 grams in gold and about 920 grams in silver per metric ton. The concentrates (25 into 1) give 120 grams gold and 2,200 grams silver.

The cost of treatment is distributed about as follows:

20 mules for 7 days.....	\$25.00
4 men on torta for 7 days.....	10.10
Helpers.....	7.00
Mechanical loss of mercury.....	20.00
Salt, 2 tons at \$35.....	70.00
Chemical loss of mercury.....	33.00
Blue vitriol, 150 kilos, at 8 cents.....	12.00

Cest for a torta of 40 tons.....	177.10
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The cost per ton of treatment is \$4.43; cost of milling, \$2.20; administration, \$1; making the total cost per ton \$7.63 Mexican money, equal to \$3.75 American money.

As soon as the two Bartlett tables are in operation a much better grade of concentrates will be secured. Regardless of the latter the margin over the patio treatment is more than \$20 in Mexican currency.

THE UPLAND PLACERS OF LA CIENAGA, SONORA, MEXICO.

[ROBERT T. HILL, in *The Engineering and Mining Journal*, New York, January 25, 1902.]

In May, 1901, the writer was requested to examine certain auriferous deposits in the vicinity of Cienaga, district of Altar, State of Sonora, which in some respects may be described as a diminutive American Kalgoorlie. The point was reached by an overland journey of some 60 miles from the city of Magdalena, on the Sonora Railway.

Inasmuch as this is one of the oldest gold districts in America, from which the metal has been taken for nearly 300 years, a brief description of it may be of interest.

Northwestern Sonora is a dreary desert country. A few rivers like the Magdalena, Sonora, and Yaqui drain the western slopes of the Sierra Madre and attain considerable volume in their upper waters, but they gradually decrease in copiousness until most of them sink into the desert wastes before reaching the Pacific except in times of extreme flood.

Immediately west of the main scarp of the Western Sierra Madre there is a rough, broken country composed largely of distorted rocks of Paleozoic and Mesozoic age, capped by vast sheets of dissected cantera, as the volcanic tuff is appropriately named, which constitutes such a conspicuous feature in Trans-Pecos, Texas, and in Chihuahua and Sonora, Mexico.

To the west of the Sonora Railway, however, the cantera apparently ceases and the country is one of the wide mesquite deserts broken here and there by low hills, showing signs of great topographic antiquity. The Magdalena River, which at Magdalena is a flowing stream, soon ceases to carry water upon the surface of its stream bed west of the railway, but it continues as a topographic feature marked by a wide valley of loam and gravel covered by dense thickets of the species of mesquite-like tree called "cat's claw." This tree seems to inhabit subirrigated soils, and there is little doubt that much of the water of the Magdalena River continues its course toward the Pacific beneath the surface in the sand of its stream bed, for I found in the stream valley, some 20 miles below where the permanent water ceased, an extensive irrigated wheat ranch owned by Señor Cerno, one of the brothers who are feudal landowners of the surrounding country.

At this farm wells were sunk in the second bottom of the stream way to a depth of 10 to 15 feet, which pumped a tremendous volume of water sufficient to irrigate about 2,000 acres of wheat land. The bearing of this underground water upon the subject of the gold deposits will be presently apparent. A few feet above the wide-indented stream ways and their low second bottoms the country is mostly desert adobe soil, inhabited by a few species of cactus and occasionally a struggling growth of mesquite; but throughout the whole area I failed to observe a single sprig of grass.

About 40 miles west of Magdalena is a peculiar terrace hill known as La Trinchera. The terrace upon this hill, which from a distance looked like lines of stratification, were really the works of man, and Mr. W J McGee, of the Bureau of Ethnology, informs me that it is one of the most interesting prehistoric monuments of this portion of Mexico.

At the foot of this mountain there is a small village of primitive people by courtesy called Mexicans, but who in their habits and racial features are the aboriginal Papagos and Yaquis of this part of Sonora. It was here that I saw the first evidence of gold mining, and this as well as all the other industries of the village was of the most primitive character. From the adjacent hills the quartz ore was brought in sacks on burros. This was placed upon a flat stone and pulverized with large, round boulders by small boys, this being apparently the first progenitor of the modern stamp mill. The pulverized material was then placed in a primitive arrastre, ground for thirty days by a perambulating burro, and amalgamated.

This industry, so the urbane proprietor informed me, had been carried on by himself and ancestors for many generations, and from the ruins of the arrastras in the neighborhood and local tradition there is little doubt that gold has been mined here in a primitive fashion since the first invasion of Sonora by the Spaniards in 1530, and probably prior to that time by the people who previously inhabited it. From this place onward we found the country inhabited entirely by the peasant class, whose only means of livelihood was to proceed to the hills when in need and procure a little gold with which to purchase the commodities of life. About 60 miles from Magdalena and about 30 miles from Cienaga we encountered the first of the rich placers, which it is the object of this paper to describe.

El Tiro is situated in the saddle of a low beaded row of hills, and consists of a village of three primitive Mexican stores and a 20-stamp quartz mill. The hills at this place rise about 500 feet above the adjacent desert, toward which they gently slope. They consist of metamorphosed slates cut by numerous quartz and dioritic veins highly tilted and occasional Paleozoic limestones. Disintegration seems to attack the surface of the summits very uniformly, resulting in finely shattered and almost pulverized material, having the nature of a very light sandy loam. Rainfall does not seem to be sufficient to remove this waste to any great distance at a single time. As a result the slopes of the hills are covered with this material, which in a previous technical paper I have termed "the wash," from very near their summits to the plain. Upon approaching these hills I saw several parties of Mexicans doing dry washing with primitive machines of the wheat fan type, and upon examining their results was astonished at the apparent richness of the ground. As these machines can only use the dry surface dirt, and the material has to be sifted before running through them, the whole face of the country was covered by small shallow pits and slight mounds, representing the work of the dry washers for many years. In the village of El Tiro the medium of exchange consists entirely of gold dust, and every merchant keeps scales, and beneath his counter various crockery utensils full of nuggets. By inspecting the stocks on hand I was enabled not only to obtain a good study of the size, nature, and character of the gold, but to purchase an excellent collection of specimens. An interesting fact about this gold was that it mostly consisted of large free and sharp grains, varying from a pin head to a hen's egg in size. Wire gold was very common, and it all attested the fact that it was derived from near-by sources in the hills.

From El Tiro to Cienaga, 30 miles, the road crosses two wide deserts separated by one low chain of hills about 9 miles north of Cienaga. The village of Cienaga is one of the most primitive places that I have ever visited, consisting of a few adobe houses, the ruins of an ancient Spanish mission church, and a few straggling date palm trees. The inhabitants are nearly all Mexicanized Papagos and Yaquis, and here, as at El Tiro, the sole source of revenue is the gold "dry washes" from the adjacent hills. The whole country for miles around Cienaga is pitted with the dry washer diggings, and even in the town itself the principal streets, the cemetery, and the walls of the old church are undermined by them.

How long gold has been obtained at Cienaga in this manner is unknown, but tradition makes it the oldest gold-mining district of Mexico. Its gold was famous in the early annals before the discovery in California, and old Californians acknowledge their indebtedness to the Sonoran Cienagans for the rocker, pan, and other methods first introduced into that country. To the south of Cienaga are many low pointed hills, and there is an area of probably 20 square miles which has been worked over and over again by the methods described at El Tiro.

The free gold, both at El Tiro and Cienaga, is clearly derived from the summit portions of the near-by hills, and the supply is in part renewed after each rainfall, when the natives turn out en masse to clean up the gold collected upon the edges of the vertical outcrops of the thin slaty strata in the little rills and road cuts. Apparently the gold is in many small leads, although several quartz leads of sufficient size have been encountered in the district to justify stamp milling.

The placer gold is found in all the débris of the slopes. This consists of a loamy sand with very little clay, and occasional thick bands of caliche or lime cement. The dry washing is altogether superficial. In a few places pits have been sunk 10 or 15 feet into the caliche, which usually runs very high in gold.

The object of my visit to Cienaga was to make a preliminary report upon the gold dirt and to ascertain if there was any feasible method of recovering it. I made many dry-wash samples, which averaged over \$1 a yard, and being satisfied that the dry-washing process did not save over 30 per cent of the gold, I concluded that selected ground would at least average \$3 to the cubic yard. Since my visit thorough samplings of the ground have been made, and these show an average of \$1.84 to the cubic yard, with large tracts running over \$3. Inasmuch as the samples collected were mostly superficial and largely taken from the dry soil at the immediate surface, the great richness of the ground is unquestionable.

The fact of the gold being apparent, the important problem was to ascertain if there was any manner of applying water to the recovery of this gold, and herein came the application of an interesting study of the question of underground water. So far as I am aware I was the first to advocate some dozen years ago the principle that in the desert region of arid America the underground conditions are such that they are favorable for the collection of water in the loose detritus filling the desert valleys rather than in the impervious mountain rocks which outcrop around the rims of the deserts and lie beneath them as a floor. In the vicinity of Cienaga there are three large desert basins, and each of these indicate a supply of underground water which if properly conserved and applied is capable of saving much of the gold of the rich placer deposits. The smallest of these deserts, only a few miles in extent, is that in which the village of Sonora itself is situated, and here the most apparent evidences of a considerable store of underground water was manifested by the Cienaga itself, from which the village takes its name. This is nothing more or less than a point in the lowest part of the basin where the ground water comes out at the surface. Numerous wells in the village strike this water at a depth of about 8 feet. That the water is in considerable quantities is also evinced by the fact that a small stamp mill has been run for many years in the village. A low chain of hills separates Cienaga from a still larger basin some 10 miles in cross section to the northward, and an arroyo leads into this larger basin through the chain of Cienaga hills from a still larger basin to the southeast. In the second bottom of this arroyo there are two wells. One of these was in constant use to run a small stamp mill, to which ore is brought from the mountains some 10 miles distant. The other, now abandoned, was constructed for the Mina Colorado, 9 miles north of the well and some 300 feet higher in altitude. A supply of water was pumped from this mill to the mine for three years through a 3-inch pipe sufficient to run a 20-stamp mill and a cyanide plant. It has since been abandoned owing to the working out of the mine.

Upon my recommendation this well was deepened toward bed rock. It has now been sunk from 15 feet, where the water was first encountered, to 57 feet, and two large pumps upon the property can not exhaust it. It is estimated that this yields about 326 gallons per minute, and the water flows in with increasing quantity with each foot gained in depth. With this water the company now has an abundant supply to fill ponds for working the ground by the dredge process, or even for fluming on a small scale, and the probabilities are that the water supply can be largely increased by other wells judiciously located.

THE PEÑOLES SILVER MINES.

[From Monthly Bulletin of the Bureau of the American Republics, February, 1902.]

The Belgian legation at Mexico City has furnished the Bulletin Commercial, of Brussels, the following information relative to the Peñoles silver mines at Mapimi, which have the reputation of being the most productive in the Mexican Republic:

"The capital of the developing company is very large, and judging from its profits and the distribution of dividends it heads the list of Mexican exploitations. In its mines and shops more than 5,000 workmen are employed. Recently six new furnaces were built and an electrical plant put in, so that the company can now crush 1,500 tons of ore per day. The shops and mines are connected by an electric railway. The installation of machinery, etc., in these mines represents a total cost of from 500,000 to 600,000 pesos.

"The mines are very extensive, and are situated in the Buffa Mountains, near the city of Mapimi. The oldest mine, known under the name of Opuela, has been exploited for more than two centuries. The present company discovered and developed veins at a depth of from 1,500 to 2,000 feet; the former concessionnaires stopped work at a depth of 1,200 feet, thinking they had exhausted the veins. Every precaution is taken for assuring the most economical extraction of the ore, and the success of the enterprise is due in great part to the intelligence and energy of the director-general. The deposits found at a greater depth (2,000 to 2,800 feet) contain the richest ores, and they guarantee profitable exploitation for a great many years.

"Many other mining companies have been established in the same district, which,

according to the opinion of the chief geologist of the Government, is destined to become the most important region for the production of silver in the Republic. It also contains deposits of copper, and several mines of this ore are to be developed.

"The Descubridora mine, 38½ kilometers northwest of Mapimi, furnished 500 tons of ore per day. The construction of a railroad connecting this property with the main line of the Mexican Central is projected, and will probably be built during 1902.

"The city of Mapimi is connected with the Mexican Central Railway by a narrow-gauge line to Dermejillo, and from there it has a connection, via San Pedro, with the Mexican International Railway."

THE MINING DISTRICT OF GUANAJUATO, MEXICO.

[Special correspondence in the Engineering and Mining Journal, New York, February 8, 1902.]

In order that the conditions existing in Mexico as a country, and of Guanajuato as a mining camp, may be better understood, a condensed account of such historical, political, and statistical matters as have a direct bearing upon the standing of the country and of this camp to-day should be given, even though some well-known facts are repeated.

This camp is so old that its discovery dates back almost to the year when the country was conquered by the Spaniards, and it is necessary, therefore, to start from the date of the conquest.

So far as possible, reference to the authorities quoted will be given, but in many cases this will not be possible, as the general facts have been gathered from a six years' residence in the country, and much of the information is the result of long miscellaneous reading of Spanish and Mexican books and periodicals and conversation with well-informed people.

HISTORICAL AND POLITICAL.

From the years 1520 to 1530, A. D., the Spaniards were occupied in conquering the original inhabitants of Mexico, and their position was too precarious to permit them to explore the country outside the City of Mexico. After the latter date, however, a settled government became established, Mexico becoming a province of Spain, governed by a viceroy, and the conquerers spread themselves over the country, establishing farms and mines at such points as recommended themselves.

* * * * *

In order to trace the history of mining in the country it is necessary to go back to the period referred to in the beginning of this article, when the Spaniards began to spread out from Mexico City in search of points for settlement. The quantities of gold and silver found in the possession of the Indians by the Spaniards during the conquest indicated a richly mineralized country and but little time was lost in locating the mines best known to the Indians. The first mines opened up were within easy distance of Mexico City, mostly to the south and in the present States of Mexico and Guerrero.

From 1530 to 1540, however, the conquest having been carried farther north and the settlers and miners following its track, the mines of Zacatecas were discovered, located about 200 miles north of Guanajuato. In 1547 these had become so productive that a train of carts was established by an enterprising Spaniard between Mexico City and Zacatecas, a distance of nearly 500 miles. The road followed by these carts took them through the present La Luz section of the Guanajuato mining district, and in the year 1547, while halting for the night at this point, their camp fires disclosed a rich vein of silver.

This discovery attracted attention to Guanajuato, and while some of the early miners worked at this first discovered point others prospected the surrounding district, with the result that in 1557 the mother vein of Guanajuato was discovered, and work was begun at the point covered by the present Rayas mine, which owes its name to the discoverer. Here the immense vein crops out, showing in the present open cut a width of more than 300 feet, with good values at the surface.

For many years the only method of mining known was that of building fires against the quartz of the vein, cracking off the rock by heat, and not for fifty years did drills and black powder come into use. In the early part of the seventeenth century this mine passed into the hands of a man named Sardeneta, and the title to the mine still remains in the hands of his descendants. Coming directly from Spain, he brought with him the latest known mining methods, using iron drills, with black powder as an explosive, and mining by means of shafts and tunnels. His success was immediate, and the large bodies of ore almost immediately opened up necessi-

tated the adoption of some means of reduction more economical than that of smelting, by which all ores had been reduced up to that time, and the discovery in Pachuca of the patio process of amalgamation was at once taken advantage of. The ores of the mother vein being of a very simple nature, this process was found to be especially adapted to them, so that within a short time the production of the Rayas mine and its immediate neighbors north and south had become so large that fifty of these mills, with a capacity varying from 15 to 20 tons daily, had been started in Guanajuato. The principal chemicals used in the patio process are quicksilver, sulphate of copper, and salt, and upon these, as well as the black powder used in blasting, the King of Spain levied a very high tax, which, in addition to the 20 per cent that, under the name of "the King's fifth," he collected upon all bullion presented for coinage, prevented the mining and treatment of ores carrying less than 100 ounces of silver per ton.

This condition of affairs lasted until Spain was driven from the country, and yet, in spite of this fact, which prevented the working of any but the richer mines, Mexico had produced during the Spanish possession nearly \$2,000,000,000 of gold and silver, of which Guanajuato, from the mother vein, produced about \$700,000,000. These figures are taken from the mint records of the Government, still existing, and can easily be referred to. From Rayas explorations were carried north and south on the mother vein, the mines of Aparecida and Sirena, to the south, and those of Cata and Secho, to the north, being opened up, and these mines, until the middle of the eighteenth century, were practically the only ones worked. The region north of Cata was considered to be barren up to this time.

The means by which the great Valenciana mine, which is north of the Cata line, was opened up are stated by Baron Alexander Humboldt, in his essay on New Spain, from page 44, volume 2 of the Spanish edition, from which the following is quoted:

"In 1760 a Spaniard who had arrived as a very young man in America began to work the vein at one of the points which until then had been considered barren. Obregon, as this Spaniard was called, was poor, but enjoyed a good reputation for honesty and secured friends who, from time to time, lent him small amounts to continue his work.

"In 1776 his workings had reached a depth of 260 feet and the expenses were still in excess of the production. But Obregon, as devoted to mining as others of his race are to gambling, subjected himself to all kinds of privations rather than abandon his enterprise.

"In the year 1767 he formed a partnership with a merchant of Rayas named Otero. How could these two men then suppose that at the end of a few years they would become the richest subjects in Mexico, and perhaps in the world? In 1768 they commenced to take from Valenciana large quantities of ore, and as they attained greater depth and reached the same relative level as the ore bodies in the Rayas mine, the grade increased, and in 1771 they took out enormously rich masses of sulphides of silver mixed with ruby and native silver. From that year until 1804, when I left for Spain, the yearly production did not fall below \$2,800,000 and the net profits to the owners has often reached \$1,200,000 per year. Obregon was made Count of Valenciana in the Spanish peerage, but in spite of his immense riches retained his simple habits and frank character."

The total production of the Valenciana mines from 1760 to the present date, as taken from its own records, is about \$300,000,000.

Its production during certain periods will be found in the annexed tables.

The principal shaft of the Valenciana mine is 1,686 feet vertically, the inclines from it bringing the total depth of the mine to over 2,000 feet, at which point it was left in ore worth \$40 per ton, but which, with the means at command, was not pay ore.

There are also on the mine six other vertical shafts varying in depth from 550 feet to 1,200 feet. This mine, as well as those of Secho and Cata, to the south, is in the possession of the heirs of Miguel Rul, one of the descendants of the original Obregon, and is still producing.

The striking of the bonanza in Valenciana caused prospecting to be carried farther north, and the mine of Alizos, now included in Valenciana, sunk the Alizos shaft to a depth of 700 feet, cutting the vein in good ore and producing largely, but other prospects farther north, after sinking 200 or 300 feet and encountering only low-grade ore, were abandoned, and this portion of the vein to the north of Valenciana remained unexplored until 1895, when a Mexican stock company was organized to work the Esperanza mine, about half a mile north of Valenciana. At a depth of 850 feet this mine has \$50 ore about 18 feet wide.

North of this mine comes the Buena Vista, in the same formation as the Valenciana and Esperanza, viz, syenite and diorite on the hanging wall of the vein and schist on the foot, and there is no reason why proper investigation of this mine should not

disclose a repetition of the great Valenciana mine. The conditions are the same, and with modern mining and treatment charges the results should be much more profitable.

In addition to the mother vein, Guanajuato has two other vein systems which have produced and are producing large amounts.

La Luz district, in which, as previously stated, the first discovery was made in 1547, is located about 6 miles southwest of the mother vein, and its principal vein is nearly parallel with the mother vein. The discovery of the mother vein, in 1557, drew attention away from the first discovery in La Luz, and scarcely anything was done there until 1832, when a company was formed to work the old mine. After ten years very rich ore was encountered, and from 1842 until the present time the district has been a large producer. The best years, as shown by the tables accompanying this letter, were from 1842 to 1859. The total production of this district to date is put at \$100,000,000.

The grades of silver ore were higher than on the mother vein, and in many points the gold ore was likewise.

The Santa Rosa district, in which the veins are also parallel to the mother vein, lies about 6 miles northeast of the mother vein, and although worked to a small extent in the past, has not been entirely exploited until modern times. At present it is credited with a production of about \$2,000,000 per year from a number of small but rich mines.

In 1824, at the end of the revolution by which Mexico attained its liberty, the country was impoverished and the mines of Guanajuato were among the greatest sufferers from the war. Their buildings and machinery had been destroyed and their workings, as a result of fifteen years' abandonment, were in a very bad shape and filled with water.

There was no capital in the country with which to reopen the mines, and the secretary of the treasury, Lucas Aleman, a young man 26 years old, conceived the idea of going to Europe for the purpose of interesting foreign capital, which under Spanish rule had not been permitted to enter the country. After securing prices on many of the principal mines he first visited France, but with no success, and then went to England, where he was successful in securing the organization of two large companies—the United Mexican Mines Company and the Anglo-Mexican Mining Company.

The companies were organized with a paid-up capital of £1,250,000 sterling, in shares of £1,000 each, and operated in all Mexico with varying success, but finally confined their mining operations to Guanajuato.

In Guanajuato they were not able to purchase any of the mines, but obtained them on thirteen-year leases, the United Mexican Company having the mines of Rayas, Cata, and Sacho, and the Anglo-Mexican Company those of Valenciana and Sirena.

The former company was the more successful in its operations and paid many dividends from the products of its mines, on which it succeeded in obtaining a thirteen-year renewal. After this second lease it transferred its operations to the La Luz district, where it was also successful, and to-day, after seventy-seven years' experience in Guanajuato, it owns or controls some 30 mining properties, covering some 2,500 acres. Only a few of these are working, however. During all this time it has continued its mining business through all kinds of political changes and has not been molested except by occasional forced loans from the Government in revolutionary times. These, however, have always been returned.

The other company, the Anglo-Mexican, was less successful in its mining operations and finally confined its operations to the mints, and when the Government took them away, some fifteen years ago, the company was dissolved. The conditions under which these companies did business and made money would appear impossible to us, as their management was both ignorant, expensive, and corrupt; but in spite of these detrimental features their books, of which the writer had charge for some years, show large profits.

ECONOMICAL AND STATISTICAL.

Under the first of these may be considered the pay rolls of the Victoria mine, which show the prices paid to-day for labor and supplies. These are very cheap, and yet as miners these people are unsurpassed, having as they do the inherited instincts of ten generations of miners. As mechanics they readily become acquainted with ordinary machinery, and as carpenters, masons, and ironworkers they are the equal of any people in the world. As regards the matter of treatment and reduction of ores, it needs to be said that the values shown in the production tables for years previous to 1890 are almost entirely the result of ores amalgamated in the patio mills, as previous to that date there were no large smelters in the country and ores below

500 ounces silver would not stand exportation charges to other countries. The result is that these values, which are almost entirely mint records, represent about 85 per cent of the silver values and less than 50 per cent of the gold values of the ore extracted, these figures representing the percentages recovered in times gone by by the patio process of amalgamation. A simple explanation of this process, which is used very extensively throughout Mexico, Central America, and South America, may not be amiss here.

The ore arrives at the mill broken up to the size of very coarse coal. Before sampling, it is crushed to pass through one-fourth-inch mesh in a Chilean mill, operated by mule power and consisting of a stone wheel about 12 feet in diameter and 2 feet thick, with an iron or steel rim revolving on its own axis and also traveling around a circular space about 30 feet in diameter. The ore is thrown under it and, after being ground to the desired size, is thrown by hand against an inclined screen, through which, when ground to the proper size, it falls to the floor. The capacity of one of these Chilean mills operated by six mules, frequently changed, is about 15 tons per day. After this preliminary grinding the ore is sampled and assayed and then passed to the second grinding in the arrastras. These are circular pits, about 8 feet in diameter and 3 feet deep, walled up above the floor for another foot. Their bottom is formed of very hard stone set up on end, and in the center is a pivot upon which a beam is fixed extending beyond the sides of the pit. From this beam are hung heavy stones which, when the beam is moved, drag over the bottom of the arrastra, reducing the ore to about 80 mesh. The beam is operated by a mule attached to its outer end. These arrastras have a capacity of 800 pounds each 12 hours, and each mill has from 30 to 100 of them.

When the gravels are thrown into the arrastra water and quicksilver are added, so that amalgamation of some of the free gold in the ores takes place here, only the proportion saved is much less than on the plates of a stamp battery. After grinding, and when from 200 to 500 tons of ore are obtained, the slimes are taken out of doors and distributed over a large stone floor to a depth of about 2 feet, a 500-ton "torta," as these masses of wet ore are called, covering a space of about 500 feet square. More quicksilver, sulphate of copper, and salt are added, as in the pans of a pan mill, and then for about eight hours daily horses are driven through this mass of slimes for the purpose of agitating it to permit freer chemical reactions and to insure the exposure of all parts of the mass to the heat and light of the sun.

This is continued for from ten to thirty days, depending upon the season of the year and the heat of the sun, frequent assays being taken to decide the state of amalgamation, and when no further increase in the percentage of silver amalgamated is noted the process is considered ended. The "torta" is then removed to settlers and the amalgam is separated from the tailings by agitation and is then re-torted.

But little gold is saved in this latter process, the bars generally running from 990 fine to 999 fine, with about 1 per cent gold.

The average saving of silver by this process, as noted in the results of 20 of these mills for a period of years, was 92 per cent, including a further slight saving secured by budding the tailings by hand. The saving of the gold is variable, reaching 60 per cent when there is much free gold, and not passing 40 per cent when the gold is carried in the form of sulphides, as is usual. The results in combination stamp mills, concentrating on tables and with amalgamation of the tailings in the pans, have been from 70 to 80 per cent of both silver and gold, but the process is equally expensive, the cost in patio mills averaging \$9.69 Mexican currency per ton and in a 20-stamp mill reaching \$11.

As all gold values given in the tables are the result of this process, it can be seen that the actual gold values extracted from the mines are quite double those of the tables.

During the past year Mr. W. Leonard Holmes, the well-known cyanide expert, spent some four months experimenting in the mill of the Guanajuato Consolidated Mining and Milling Company, owners of the Sierra mine, with the cyaniding of these ores, and in a long detailed report on the matter published by the company he claims to secure 90 per cent of the silver and gold values in a 128-ton per day plant, at an expense for crushing, concentrating, and cyaniding of about \$7 per ton, Mexican.

As regards the cost of mining, no figures for work done under modern methods of hoisting, etc., can be given, but under the present methods of carrying everything on men's backs the cost of producing 50 tons per day is about \$5 per ton, and it is almost sure by proper and intelligent direction of the cheap but good labor, which is so plentiful, that a mine producing 100 tons per day could reduce the mining cost to \$2 per ton at least.

In regard to the average grade of ores, Mr. Charles B. Dahlgren, M. E., in his work, Historical Mines of Mexico, gives, as the result of careful investigations, the following data:

Average silver per ton.

	Ounces.
1782.....	102
1803.....	80
Rayas mine.....	140
1737.....	175
1791.....	98

Total average for all time, 70, and the average gold assay, 0.6 ounce per ton.

Putting these latter figures into American currency, the average value per ton for silver and gold combined would be \$52, United States currency, per ton, or, in Mexican money at the present exchange rates, \$113 per ton.

The grade taken down and sold these modern days is, however, lower, and will not average better than \$60 per ton, Mexican, the cheaper chemicals and supplies and improved milling methods rendering less sorting necessary, and making it more economical to mine and mill these lower grades of ore.

Dahlgren puts the annual production at 350,000 tons; but this is evidently an error.

The production to-day is about 500 tons daily, of which 450 tons are milled and 50 go to the smelter.

* * * * *

In regard to the financial condition of the country, the only thing lacking to-day is a larger circulating medium. Although the Government coins from \$50,000,000 to \$100,000,000 Mexican silver per year, yet such is the demand from Asia for these Mexican dollars that sufficient of them do not remain in the country to furnish a circulating medium, and for this reason the Federal Government has lately given concessions for some 20 new banks, located in various parts of the country, and permitted to issue notes to the extent of their paid-up capital, which varies from \$500,000 to \$2,000,000. These banks have in turn become stockholders in the Central Bank of Mexico City, which acts as a clearing house for them, and from its surplus capital makes them such loans as they may need from time to time.

* * * * *

VALUES COINED AND EXPORTED, 1875 TO 1887, INCLUSIVE.

Year.	Silver.	Gold.	Total.
1875.....	\$4,786,252	\$609,482	\$5,395,734
1876.....	4,544,127	506,565	5,050,692
1877.....	4,663,226	468,374	5,131,600
1878.....	4,675,896	448,722	5,124,618
1879.....	4,869,222	443,525	5,312,747
1880.....	4,587,231	394,807	4,982,038
1881.....	4,433,665	346,221	4,779,886
1882.....	4,660,309	372,790	5,033,099
1883.....	4,664,042	330,305	5,044,347
1884.....	5,343,336	462,154	5,805,490
1885.....	5,412,898	451,154	5,864,052
1886.....	4,673,769	391,628	5,065,397
1887.....	4,779,278	401,322	5,180,600
Total.....	62,093,251	5,677,049	67,770,300

GUANAJUATO, 1766 TO 1887 (122 YEARS).

Years.	Silver.	Gold.	Total.
1766-75.....	\$29,090,480	\$1,230,020	\$30,320,500
1776-85.....	44,890,280	1,802,580	46,692,860
1786-95.....	47,679,560	1,003,100	48,682,660
1796-99.....	20,247,689	888,250	21,135,935
1800-1809.....	50,756,050	2,742,676	53,498,626
1810-19.....	19,790,635	753,848	20,644,453
1820-29.....	10,934,757	797,776	11,732,533
1830-39.....	25,853,750	1,998,880	27,853,630
1840-49.....	45,807,039	4,473,928	50,280,967
1850-59.....	57,239,322	3,769,816	63,008,138
1860-69.....	42,100,724	4,436,119	46,536,840
1870-79.....	43,641,723	4,533,668	48,175,391
1880-87.....	38,654,529	3,200,380	41,754,909
Total.....	476,585,531	33,630,941	510,216,472

These figures are based upon the carefully collected statistics of Treasurer Orozco y Berra, published in the periodical *La Moneda en Mexico*, in Mexico City, in 1880, those of later date being taken from the records of the department of encouragement by Pedro Lopez Monroy, a mining engineer, who was commissioned by the Mexican Government in 1884 to write a memorial of the mines of Guanajuato, which was published by the Government in 1888 as Volume X of the *Annals of the Department of Encouragement*, and is a volume of 738 pages, devoted, with the exception of the first 68 pages, to the mines and mining interests of Guanajuato.

THE RAYAS AND MELLADO MINES, GUANAJUATO, MEXICO.

[From The Engineering and Mining Journal, New York, November 30, 1901.]

A subscriber sends the following interesting historical notice of two famous Guanajuato mines, which was originally prepared for the *Opinion Libre*, of Mexico.

"Sebastian de Aparicio, foreman of cart trains, who years afterwards became a monk and was canonized by Pius VI in 1790, and died in Puebla in the year 1600, was the first man to survey and build a road from Mexico City to the present northern frontier and to the Pacific coast, establishing relay stations at various points of the survey and often camping out on the bare plains. On a certain night of the year 1548 a party of mule freighters camped out on a spot known as San Bernabe, and in building a fire to warm themselves discovered the vein afterwards included in the district of La Luz, which became celebrated for its bonanza mines, and which in a short period of six years produced nearly \$40,000,000 in silver.

"Two years later, in 1550, in a similar manner, the freighter Juan de Rayas discovered the immensely rich mine of San Juan de Rayas, whose production of ore still continues, it being one of the principal mines of Guanajuato. This mine, according to official data, during 40 continuous years paid in taxes to the royal treasury more than \$17,000,000. During the year 1558 the mine of Mellado was denounced in Yuriariapundaro. On April 15 of the same year work was begun on the Mellado shaft, and the following day on the Rayas shaft.

"During this same year (1558) in continuing the work in these two mines there was discovered the famous gold and silver vein known as the Veta Madre (Mother Lode), which is without doubt the most remarkable and the richest vein known to the world. In thickness it reaches at times to 40 meters (131.2 feet), and its known length exceeds 13 kilometers (about 8 miles). On this vein are located the mines of Valenciana, Mellado, Rayas, Cata, Xichu, La Esperanza, and many others which have produced bonanzas of more or less importance. In 1728 work was commenced on the San Antonio shaft in the Rayas mine, but it was suspended later, and in its place the Santa Rosa shaft was sunk.

"We may mention here the following facts in proof of the enormous difficulties of shaft sinking at that time, which to-day have largely disappeared, owing to the use of modern explosives and machinery:

"The Rayas mine was leased in the year 1719 by Don José Sardeneta, he taking over the lease from his brother, Don Alferez D. Pedro, who then had it, without making much profit from it. Don José, who was a very capable and enterprising man, understood that it was better to enter into other arrangements with the owners of the mine rather than to pay rent. These owners were then various members of the family of Franco Toledo, scattered in different places, and with whom he arranged a lease on the property by which he became owner of one-half of the mine, obligating himself to sink a general shaft which was necessary for the ready and economical exploration of the property. This shaft already had a depth of 50 varas (137.5 feet), but this work proved so costly that in spite of his contracts he suspended work and began negotiating with the owners for the purchase of the entire property, which he finally succeeded in obtaining for \$200,000. From that moment Don José became the sole owner of the mine. He finished the shaft and a short time afterwards discovered a bonanza that made him the richest man of Guanajuato.

"The mines of Rayas and Mellado are contiguous and in order to facilitate the working of these properties, and to avoid the continual differences arising from contrary interests these mines were united in one company called *La Concordia*, which will without doubt become a very productive company if the proper elements for working the properties, are put in action. At present there are many enterprises tending to take from the Veta Madre the immense riches that it should still contain. It is calculated that neither the three hundred and fifty years since work begun on the Rayas nor the one hundred and forty years since the Valenciana was opened have been sufficient to exhaust this enormous vein. It is true that the great depth of these mines makes their exploitation difficult and costly, but with modern appliances it is quite probable that we will see repeated the brilliant situation attained by the city of Guanajuato when these mines inundated the world with their silver."

PORTO RICO.EXECUTIVE MANSION, *San Juan, April 8, 1902.*

SIR: I herewith inclose you some facts, briefly stated, connected with the mining interests of the island. They have been prepared in the interior department of the insular government, and I send them to you, believing that they are what you want and referred to in your recent letter.

Respectfully,

WM. H. HUNT, *Governor.*

The DIRECTOR OF THE MINT,
Treasury Department, Washington, D. C.

METALS IN PORTO RICO.**GOLD.**

Of the numerous rivers and smaller streams whose sources are in the highlands of Luquillo, in the northeastern part of the island, the waters of the Mameyes, Rio Prieto, Sabana, Fajardo, Gurabo, Espiritu Santo, and Rio Grande are known to carry gold dust and nuggets.

The rocks found in the watershed of the Mameyes River, which is the richest in gold, are mostly eurite and porphyry, crossed with veins of quartz and iron pyrites. Alluvial deposits, composed of clay, sand, boulders, and deposits of an analogous nature, form the middle and lower part of these watersheds. The depth of the deposits is variable.

Gold occurs very near the surface on the higher slopes of the hills, while in the valleys the auriferous strata are covered by sterile masses.

Gold is present also in the watersheds of the rivers Corozal, Negros, Congos, Cibuco, Mavilla, and Manatí. In the bed of the Congos River pieces of quartz have been found containing from 8 to 10 grains of pure gold each. At one time a plant for washing auriferous sands was established in the district of Corozal, which yielded from \$2.17 to \$4.30 per ton of sand.

There are also placers in the districts of Mayaguez, San German, Yauco, and Coamo where gold is obtained in grains and nuggets. The nuggets are sometimes of considerable size and value.

SILVER.

It has been impossible to obtain accurate data with regard to silver. In a report prepared in 1879 by the chief engineer of the bureau of mines reference is made to certain samples of silver found in the Barrio Llanos in the district of Isabel. In other official documents the presence of silver in the northwestern part of the island is affirmed.

THE CENTRAL AMERICAN STATES.

Mr. William Lawrence Merry, United States minister to Costa Rica, states, in reply to this Bureau's interrogatories, that gold to the value of 267,227 colones was declared at the custom-house for export, no weight being given. He adds: "This is the only data obtainable, and does not cover the output of the mines." The above value would indicate a fine content of 186.97 kilograms, or 6,011 ounces, worth \$124,261. This figure differs but slightly from that given in the statement of imports of the precious metals from Central America into the United States during 1901, viz, \$123,655. During that year the imports of silver from Costa Rica into the United States amounted to 2,281 ounces, of the commercial value of \$1,369.

Nicaragua produced in 1901, according to the report of Mr. Chester Donaldson, United States consul at Managua, 1,172 kilograms of gold,

worth, approximately, \$435,000, which would indicate a fine content of 654 kilograms, or 21,043 ounces. The product as reported therefore was only 0.559 fine. This figure, \$435,000, is \$42,244 in excess of the amount of gold reported as imported into the United States from Nicaragua in 1901, but this excess may have left Central America by way of some port not belonging to Nicaragua.

In 1901 Nicaragua exported silver to the United States to the value of \$23,483, which would represent 39,138 ounces.

This Bureau has received no reports of the production of gold and silver in Guatemala, Honduras, and Salvador in 1901, and consequently is obliged to have recourse to the statement of exports from these countries into the United States.

Following is a statement of Central America's exports of the precious metals to the United States in 1901:

GOLD EXPORTS.

States.	Weight.	Value.
	<i>Ounces.</i>	
Costa Rica	5,982	\$123,655
Honduras.....	5,459	112,857
Nicaragua.....	18,999	392,756
Salvador	532	10,982
Total.....	30,972	640,250

SILVER EXPORTS.

States.	Weight.	Commercial value.	United States coining value.
	<i>Ounces.</i>		
Costa Rica.....	2,282	\$1,369	\$2,951
Honduras	831,962	499,177	1,075,667
Nicaragua.....	39,138	23,483	50,603
Salvador.....	6,243	3,746	8,072
Total	879,625	527,775	1,137,293

The gold production of Central America for 1901 is accordingly placed at 30,972 ounces, of the value of \$640,250, and the silver, at 879,625 ounces, of the commercial value of \$527,775, equivalent to the United States coining value of \$1,137,293.

The figures as finally corrected for the gold and silver production of the Central American States, from 1897, are as follows:

GOLD.

Year.	Weight,		Value.
	Kilograms.	Ounces.	
1897.....	701	22,535	\$465,800
1898.....	735	23,642	488,700
1899.....	881	28,355	586,100
1900.....	752	24,188	500,000
1901.....	963	30,972	640,250

SILVER.

Year.	Weight.		Coining value.	Commercial value.
	Kilograms.	Ounces.		
1897	25,258	811,892	\$1,049,700	\$487,100
1898	22,288	716,412	926,300	422,700
1899	28,377	912,170	1,179,400	547,300
1900	31,523	1,013,285	1,310,100	628,200
1901	27,365	879,625	1,137,293	527,775

From the above table it will be seen that the gold product for 1901 was nearly 20 per cent more than the average for the five years, and was 28 per cent greater than it was in 1900. The silver production, on the other hand, was about 16 per cent less than the yield of 1900, and about 1.5 per cent greater than the annual average of the period under consideration.

THE GOLD MINES OF COSTA RICA.

[MILTON FRANKLIN REITZ, in The Engineering and Mining Journal, New York, August 16, 1902.]

Like the mines of every other part of the world, something has been said and written of those in this Republic.

* * * * *

COSTA RICA.

The name, meaning "rich coast," was given to the country by the first Spanish explorers in 1512, when they were attracted by the many golden images worn by the native Indians. Many of these gold idols, dug from old burying grounds, are found in the collections made by the pioneers.

* * * * *

The Republic has an area of 34,000 square miles, and the population, according to the census of 1901, was 311,444. The ports of entry—Puerto Limon, on the Atlantic, and Puntarenas, on the Pacific—lie on the tenth parallel, which crosses the higher developed section, the central part of the Republic. These ports have excellent landing and shipping facilities and are both connected with the interior by railway.

The laws of the country governing mining are liberal and ample. Mining machinery and supplies are admitted free of duty and full protection is accorded the business.

* * * * *

ECONOMIC CONDITIONS AFFECTING MINING.

Climate.—The climate in all localities where mines are now being worked and in all places where work is contemplated is healthful and pleasant. The general elevation of the mines is about 1,800 feet.

Observations taken at this elevation at the Ahuacate mines indicate the average temperature at 72° F. The temperature varies but little during all the year.

Water.—This important element is well provided, and the supply of pure water is sufficient for all purposes. The mountain streams afford ample power and are numerous in the mining districts, so that immediate or transmitted power is available at moderate expense.

Timber.—The native woods are well adapted to mining purposes and abound in sufficient quantity in most localities to supply this demand for many years. The timber requirements can in most of the mines be reduced to less than past consumption by employing modern methods.

Cheap power and labor being available, good lumber is produced at moderate cost.

Labor.—The native labor is good, cheap, and steady. The miners are hard working and intelligent. The maximum price paid to drill men is 3 colones, or \$1.35 gold, per day, and ordinary labor is secured at half the price.

GEOLOGY AND MINERALOGY.

The country rock is of igneous origin; diorite and the porphyries are the more common. Large black boulders conspicuously mark many localities. It was due to this fact that Los Quemados (which means "the burned"), a village in the interior, was so named. The ores bearing the precious metals usually occur in fissure veins, and the gangue consists principally of quartz, clay tale, and porphyry. The values are largely held by crystalline quartz, which occurs in all its varieties, from the pure white and barren to the highly mineralized, carrying sulphides of the base metals in varying proportions and in rarer cases manganese, arsenic, and antimony. Ores presenting highly refractory features are rare. The remaining gangue often carries gold which has been freed from the quartz by aqueous agencies, to which the oxidation of the base metals and the crumbling of the quartz was probably due. The percentage of silver values in the auriferous ores I have examined is comparatively small, but it is said there are some rich silver ores.

HISTORY.

Lost and perilous expeditions, intrigues, persecutions, and other causes, especially the marine disaster suffered by the governor of Costa Rica, Juan Vasquez de Coronado, occasioned much delay in the development of the first mineral discoveries. This was retarded also by frequent invasions by the Talamancas and other Indian tribes. During two centuries prior to 1815 but four mineral discoveries are of record, and but two of these are located.

The first discovery affecting the principal mines known to-day was made in the district of the Aguacate Mountain (then called El Torroto) by the Spanish Bishop Garcia, bishop of Costa Rica and Nicaragua, while crossing the mountain over the old trail which connected Cartago—the destination of the bishop on this journey—with other important provinces within his dominion. The principal residence of the bishop was then in Nicaragua, and a visit from him to Costa Rica was a notable event. In this particular instance more than thirty years had elapsed since the visit of his predecessor, Bishop Tristan; hence, in order to show their appreciation of the event, the Costa Ricans sent a delegation of prominent citizens to accompany him from Esparta to Cartago.

On their way through the Aguacate Mountains the bishop, who had some knowledge of ores, observed the outcropping of a vein over which they passed, and suggested the probability of gold and silver veins existing in the locality. This discovery was made on the main ledge of the mine, afterwards recorded as the Sacra Familia. The place is still marked by a surface working, made in the discovery days. A Spanish gentleman, Don Santos Lombardo, of Cartago, a member of the delegation, took some samples to Cartago, had them assayed, and found them to be rich in gold. Returning in company with two friends, one of whom was Don Rafael Gallegos, second president of Costa Rica, they registered the mine under the name of Sacra Familia (Holy Family).

These first and the many subsequent discoveries caused much excitement in Costa Rica, and prospecting was actively entered into.

GOLD-MINING ZONE.

The gold-mining zone of Costa Rica lies on the Pacific slope and comprises three different districts, viz: The mines of the Aguacate Mountain, Monte de Oro district, and the Abangares district.

MINING DEVELOPMENT.

[From Monthly Bulletin of the Bureau of the American Republics, February, 1902.]

Reports from the various mining districts of the Republic of Costa Rica indicate renewed activity in developing the mineral resources of the country. New companies are being formed and new methods are being applied to mines already in exploitation. The Abengares Gold Fields Company, Limited, operates on the Pacific side of the Republic and is opening its mines at lower levels than heretofore. The production, with a 10-stamp mill, averages from \$8,000 to \$10,000 per month, and arrangements have been perfected to increase the number of stamps to 40. Extraction is made by amalgamation and cyanide, and averages 90 per cent.

A reorganization of the company working the gold mines lying in the Aguacate Mountains is being effected, the company being capitalized at \$5,000,000. The mines in question have been idle for twelve years and are estimated to have produced

\$7,000,000 up to the time extraction ceased. Tunnel driving has begun at two points and extensive development at the lowest possible tunnel level is being arranged.

The new company includes leading business men of San José. The mines known as "La Union," near Miramar, on the Pacific side, have been idle for a year past, but are now working again through new and lower tunnels. A 20-stamp mill, with chlorination annex, is used.

The ore is reported as low grade, but occurring in large bodies. El Porvenir mine, situated on the Machuca River, 12 or 15 miles from the Pacific coast, is being worked by a new company composed mostly of citizens of the United States, known as the Rio Grande Gold Mining Company. From \$40 to \$60 per ton represents the average value of the ore. The Thayer Mining and Milling Company has purchased the mines and mills of the Bella Vista Mining and Milling Company and is operating two 20-stamp mills at present, but purpose to employ a more extensive plant in the near future.

SOUTH AMERICA.

COLOMBIA.

The Republic of Colombia prepares no official statistics of her production of the precious metals. It is therefore necessary to have recourse to statements of the imports of gold and silver ore and bullion into the United States, Great Britain, and Germany, these countries receiving nearly if not all of Colombia's product of gold and silver. A small amount may go to France; but as that country, in her official statements of exports, does not separately enumerate all the various countries of origin, it is impossible to ascertain the exact amounts of gold and silver which she obtains from Colombia. These amounts, however, in any event, are so small as to be negligible quantities in the estimate of the world's production.

According to data compiled by the United States Bureau of Statistics, the imports of gold and silver ore and bullion from Colombia into the United States in 1901 were as follows:

	Ounces.	Value.
Gold	22,607	\$467,323
Silver:		
Ore and base bullion	10,097	6,058
Bullion	21,135	14,482
Total	34,232	20,540

The statistics of Great Britain's imports are obtained from the Annual Statement of the Trade of the United Kingdom for 1901, and are as follows:

	Ounces.	Fine ounces.	Value.
Gold	^a 119,555	109,592	\$2,265,468
Silver:			
Ore	31,648		18,989
Bullion	1,815,769		1,089,461
Total	1,847,417		1,108,450

^a Assumed to be 0.916 $\frac{2}{3}$ fine.

According to information elicited by this Bureau's interrogatories, Germany imported no silver in 1901 from Colombia, while her imports

of gold amounted to 103 kilograms of bullion which, on the assumption that it was fine, would be worth \$68,454.

From the above statements it will be seen that Colombia's total exports of gold and silver, which are assumed to constitute her entire output, were as follows:

	Fine ounces.	Value.
Gold	135,513	\$2,801,245
Silver.....	1,881,649	$\left\{ \begin{array}{l} a\ 2,432,839 \\ b\ 1,128,990 \end{array} \right.$

a Coining value.

b Commercial value.

EXPLORATION OF UNKNOWN REGIONS IN SOUTH AMERICA.

[From Monthly Bulletin of the Bureau of American Republics, February, 1902.]

MINERAL WEALTH.

The region of the cordillera of the Andes contains an abundance of mines of gold, silver, iron, copper, coal, mercury, and many other kinds of minerals, and besides the famous emerald mines of Muzo and Coscuez, which are located in Colombia and are the only ones in the world. In Brazil, in the State of Minas Geraes, are located the famous diamond mines.

At the foot of the cordillera, and in the beds of the rivers which descend from it, there are to be found an abundance of alluvial and placer gold mines as rich as those of California. The Indians extract from them important quantities of gold.

It is very difficult to calculate, even approximately, the number of savages which inhabit this immense region. We believe that they number some hundreds of thousands, and may be easily attracted to civilization, because their characters are generally kind and hospitable. They can assist greatly in the exploitation of the enterprises that may be established there.

THE GOLD MINES OF COLOMBIA.

Before the conquest the territory now forming the Republic of Colombia was acknowledged by the aborigines as the richest in gold. When Columbus arrived at the Antilles the natives informed him that the gold, which they possessed in large quantities, was obtained from the Indians who inhabited the coast of that territory.

The immense gold treasures found in Peru by the Pizarros and Almagros came mostly from the mines of Barbacoas, on the Pacific coast, between Tunaco and Pasto, and from those of Nobita, on the Chaco, whose natives bought with gold the salt which is not found in that region, but which was abundant in Peru. At present that commerce still exists on a large scale, and many vessels are engaged in the trade.

The abundance of gold in Barbacoa is so great that even the agricultural implements used by the Indians, such as axes, machetes, knives, etc., and household utensils, as plates, cups, etc., were made of gold, as proved by those found in Indian graveyards, because it is known that the habit was to bury the dead together with such articles of gold as they possessed during their lifetime.

The Quimbayas Indians, who lived in the Andes between Bogotá and Popayán, possessed gold in such large quantities that there was found, a few years ago, in the tomb of one their chiefs, a treasure of various objects, weighing many pounds, and which was presented to the Queen of Spain by Colombia. These can be seen in Madrid. In the Indian cemeteries there are frequently found treasures amounting in value to several thousands of dollars, being jewels with which they used to be buried.

The El Dorado fiction, in search of which Hernan Pérez de Quesada, brother of Gonzalo Jimenez de Quesada, the conqueror of the country which to-day is called Colombia, made his famous expedition from Bogotá to Pasto, on the eastern slopes of the Andes, traversing more than 200 leagues over the rough mountains, has its origin in the tradition that at the approach of the conquerors the Indians hid an immense treasure, which up to the present time has not been found.

During the colonial epoch the Spaniards worked the mines of Antioquía, of Choco Alto, of Quildo, of Nóbita, and the famous mine "El Medio," that of Timpiquí, of Barbacoas, and of the interior of the Cauca, employing in them the Indians and the negroes whom they brought from Africa, and with such great success that they made

themselves millionaires. In some cities like that of Popayán, the capital of the department of Cauca, in which they erected palaces for their private residences, there were very rich people, like a certain Valencia, the founder of the house of the Counts of Casa-Valencia, who established a mint with his private means, which he presented to the Government, and who constructed an aqueduct for the city.

It is stated in the archives of the Indies, and in all official documents, that the greater quantity of gold which Spain derived during all the colonial period was produced in the New Kingdom of Granada—to-day Colombia.

When Baron Humboldt visited that country, at the beginning of the past century, he investigated the auriferous lands of Chaco, Antioquía, and Cauca, and it was his opinion, as may be seen in his work, that these districts are the richest in gold in the world.

After this country achieved its independence from Spain, the liberty of the slaves was decreed by the Government, and the gold mines were thenceforth not worked with regularity, and by the lack of means of communication modern machinery could not be introduced, by the use of which even relatively poor mines, like those of the Transvaal, may give immense results. It is said that the gold mines of Colombia may be worked with such machinery, and that will be the case when the railroad can transport it. It will be seen that the opinion of Baron Humboldt is correct and that neither the Klondike nor the Transvaal are richer in gold than Colombia. Not many years ago, from the mine of Cargazón, in Barbacoas, a mass of pure gold was extracted weighing 500 kilograms (1,102.3 pounds), without the necessity of reduction.

In the streets of that city, in the yards of the houses, and on all sides, gold is found in abundance. At the present time the mines of Cana, in Panama; of Zancudo, in Antioquía; the famous one of Echandia, and of Timbiquí, in Cauca, are worked with excellent results. In Chacó, in Nóbita, and Quibdo, platinum, which is almost as highly valued as gold, is found in abundance.

The Inter-Continental Railway, which will traverse the whole auriferous region of Colombia, will open this wealth, now abandoned and almost unknown, to commerce and industry.

THE GUIANAS.

BRITISH GUIANA.

Mr. George H. Moulton, United States consul at Demerara, states, in answer to this Bureau's interrogatories, that British Guiana produced during the calendar year 1901 placer gold to the amount of 101,014 ounces, valued at \$1,771,620. The product of the colony is of various degrees of fineness—some districts producing gold of high purity—its average fineness being 0.930. Nearly the entire output was exported to England, and but an insignificant quantity was used in local manufacturing.

Preparations are now being made in the colony for hydraulic mining, also for dredging in the Puruni River, from which very favorable results are expected.

Following is a statement of the gold produced in the colony, by districts, for the fiscal year ending March 31, 1901—figures, by districts, for the calendar year not being available:

	Ounces.
Barima.....	17, 356
Barama.....	9, 443
Cuyuni.....	23, 473
Groete Creek.....	1, 577
Puruni.....	16, 856
Mazaruni.....	1, 274
Essequibo.....	14, 476
Potaro.....	26, 563
Demerara.....	77
Berbice.....	3
Total.....	111, 098

DUTCH GUIANA.

Mr. George H. Moulton states as follows:

The gold produced in Dutch Guiana in 1901 weighed 740,213 kilograms, of the commercial value of \$405,635. It assays about 0.990 fine. No silver is produced in the colony. There are no refineries here.

The value of \$1,771,620 assigned to the 101,014 ounces produced by British Guiana would indicate a fine contents of 85,702 ounces; while that of \$405,635, given as the commercial value of the gold product of Dutch Guiana, represents 19,622 ounces.

FRENCH GUIANA.

During 1900 there was a marked development in the gold-mining industry of French Guiana, owing to new and important discoveries, especially in the Inini Creek. This Bureau has received no official data of the production of that year, but such information as has been secured leads to the belief that the colony's gold production in 1901 increased, as compared with that of 1900, by not less than 33 per cent and probably by one-half. The mining laws of the colony are such that there is a considerable amount of gold exported surreptitiously. The average declared production for the first four months of 1901 was 215 kilograms. Assuming this to have been fine, its value would be approximately \$143,000; this average monthly rate maintained for the year would give a production of about \$1,700,000. But in view of the statement made by the United States consular agent at Cayenne that, "during October and November, 1901, over 2,000 pounds of gold were brought down to Cayenne," the monthly output seems to have rapidly increased. This Bureau, therefore, estimates that during 1901 French Guiana produced gold to the value of at least \$2,000,000.

The figures for the gold product of the Guianas, from and including 1897, as finally corrected from official reports, are set forth in the appended table:

	1897.			1898.			1899.		
	Kilo-grams.	Ounces.	Value.	Kilo-grams.	Ounces.	Value.	Kilo-grams.	Ounces.	Value.
British Guiana ..	3, 110	100, 950	\$2, 086, 820	3, 082	99, 105	\$2, 048, 700	3, 070	98, 712	\$2, 040, 500
Dutch Guiana ...	906	29, 127	602, 100	856	27, 532	569, 100	871	23, 196	479, 514
French Guiana..	2, 311	74, 299	1, 535, 890	2, 474	79, 547	1, 644, 400	2, 541	81, 691	1, 688, 700
Total	6, 357	204, 376	4, 224, 810	6, 412	206, 184	4, 262, 200	6, 482	203, 599	4, 208, 714

	1900.			1901.		
	Kilo-grams.	Ounces.	Value.	Kilo-grams.	Ounces.	Value.
British Guiana.....	3, 190	102, 558	\$2, 120, 062	2, 666	85, 702	\$1, 771, 600
Dutch Guiana.....	698	22, 439	463, 873	610	19, 622	405, 635
French Guiana	2, 071	66, 582	1, 376, 372	3, 009	95, 750	2, 000, 000
Total.....	5, 959	191, 579	3, 960, 307	6, 285	201, 074	4, 177, 235

GOLD PRODUCTION IN FRENCH GUIANA.

[From L'Economiste Europeen, October 25, 1901. Letter to Le Temps, Paris.]

Cayenne is deserted. The whole population has departed for the mines. This exodus is due to the good results of the first months of the year in the old placer

regions as well as in the deposits discovered in the Inini Creek, an affluent of the Maroni. According to official figures, the average declared monthly production for the first four months of the year was 215 kilograms of gold. The actual production, however, is known to have been much greater than this amount. Frauds due to a desire to avoid payment of duties have been so numerous that it is impossible to get at the actual production. The wealth of the auriferous deposits of Guiana is showing itself more plainly each day, and it has been now proved that its alluvial wealth may be in future exploited methodically and economically with the aid of powerful dredges.

[From the Engineering and Mining Journal, November 30, 1901.]

According to a recent report (November, 1901), there were 11 concessions for gold mining in force in French Guiana, of which only 4 were regularly worked. In addition to these concessions there were 325 prospecting licenses in force, under most of which men were at work prospecting or working small placers.

NEW GOLD FIELDS IN FRENCH GUIANA.

[From the Engineering and Mining Journal, February 15, 1902.]

United States Consul Moulton, of Demerara, reports, December 18, 1901, that he has been advised by the consular agent at Cayenne that the rich placer gold diggings in the Inini River district of French Guiana are attracting many prospectors to that locality. During October and November last over 2,000 pounds of gold were brought down to Cayenne, and according to the agent other large lots will soon follow. The consul adds that in view of the greater number of foreigners who may be attracted to the colony the government has passed an ordinance requiring passports from such persons before they are permitted to land.

FRENCH GUIANA.

[From Annales des Mines, No. 9, 1901.]

Decree of the President of the Republic, dated July 20, 1901, regarding the circulation, sale, and export of native gold from French Guiana.

Report to the President of the Republic of France:

PARIS, *July 20, 1901.*

To the President:

I have the honor to submit a suggestion for a decree, in conformity with article 3 of the law of January 8, 1877, approving a resolution of the governor of Guiana, dated February 28, 1901, prescribing heavier penalties than those laid down by the common law against illicit dealing in the products of the gold industry.

Similar penalties were prescribed by the resolution of October 20, 1876, regulating the sale and circulation of gold in French Guiana, but following the decree of March 6, 1877, promulgating in the colony the law of January 8, 1877, the courts frequently decided that by virtue of article 3 of the said law these penalties ought to be no more severe than those prescribed by the simple police code.

With a view to changing these conditions, which are too favorable to delinquents, I have the honor to request you to sign the proposed decree.

The new regulations have received the consent of the council of state.

I have the honor to be,

ALBERT DECRAIS,
Minister for the Colonies.

The President of the Republic of France, acting upon the report of the colonial minister,

By virtue of the law of January 8, 1877, substituting the metropolitan penal code in the colonies for the colonial penal code;

By virtue of the decree of March 6, 1877, promulgating the said law in Guiana;

By virtue of the decree of March 18, 1881, amended by the decree of May 27, 1882, regulating prospecting and developing auriferous beds and veins in Guiana;

In view of the resolution of the governor of Guiana, dated February 28, 1901, intended to suppress illicit traffic in the products of the gold industry and to regulate the circulation and sale of domestic gold;

The department of finance, war, marine, and of the colonies of the council of state having been consulted,

Decrees:

CHAPTER I.

THE PASS REGISTER, THE PASS, THE CIRCULATION AND ENTRY OF DOMESTIC GOLD INTO THE CITY.

ARTICLE 1. The "Pass Register," adopted in accordance with article 36 of the decree of March 18, 1881, shall be used nowhere except at the mines.

The giving of passes to facilitate the transportation and circulation of gold is forbidden under all conditions.

ARTICLE 2. The importation of domestic gold into the island or the city of Cayenne, except by way of the Quai of Cayenne, is prohibited.

CHAPTER II.

THE SALE OF DOMESTIC GOLD.

ARTICLE 3. All persons who sell domestic gold are required to have a register, bearing the signature of a justice of the peace, upon which shall be entered in the order of time, without omissions, changes, erasures, or interlineations, all purchases, with the names and addresses of the venders, the weights, the amounts of gold purchased, and the cost.

The register must be submitted, without change, upon request of the police commissioner, the customs officials, and agents authorized to examine into infractions of the decree of March 18, 1881.

ARTICLE 4. Persons purchasing domestic gold are moreover required to secure from the venders, as evidence of rightful possession, a duplicate of the pass furnished by the customs officials, required by article 36 of the decree of March 18, 1881. The number of this certificate must appear on the register prescribed in the preceding article.

ARTICLE 5. This certificate will be delivered to the purchaser if he has bought all the gold described in it, and the sale will be indorsed on it, attested by the signature of the vender, and, if the latter is unable to write, by those of two witnesses.

In case only a portion of the gold is bought each successive purchaser will require from the vender a copy of the certificate upon which the sale shall be plainly indorsed, attested by the signatures of the parties, or by those of two witnesses if the former are unable to write.

In the case of later sales the course provided in the two preceding paragraphs shall be observed whether the whole or only a portion of the gold is sold, as the case may be.

ARTICLE 6. The preceding regulations shall apply to all cases in which domestic gold is delivered and received in exchange or as a payment.

CHAPTER III.

ARTICLE 7. No gold shall leave the colony except through the custom-house and accompanied by the pass, or the copy prescribed by article 5, which will be retained by the custom-house officials.

CHAPTER IV.

Articles 8 to 10, inclusive, prescribe fines or imprisonment, or both, for those who neglect to observe the provisions of the above decree.

ARTICLE 11. All enactments contrary to the present decree are repealed.

ARTICLE 12. The minister for the colonies is charged with the execution of the present decree, which will be published in the Journal Officiel of the French Republic and inserted in the Bulletin des Lois and in the Bulletin Officiel, published by the colonial ministry.

Done at Paris, July 20, 1901.

EMILE LOUBET.

By the President of the Republic:

ALBERT DECRAIS,

Minister for the Colonies.

VENEZUELA.

Venezuela prepares no official statistics of her production of the precious metals, nor do statements of her exports of gold and silver

throw any light upon the subject. Mines and Quarries for 1900 places her gold exports from Ciudad, Bolivar, for that year at £63,904, equal to \$310,988, which would represent 15,044 fine ounces.

The Statistique de l'Industrie Minérale, 1901, estimates Venezuela's gold product for 1900 at 483 fine kilograms of the value of 1,664,000 francs, which would be, taking the franc at 19.3 cents, equal to \$321,152, which represents 15,535 fine ounces. This exceeds the estimate of Mines and Quarries by about 500 ounces. In the absence of other data the gold product of Venezuela for 1901 is estimated at 15,535 fine ounces of the value of \$321,152, repeating the estimates of the product of 1900.

Following is a statement (quoted from the Statesman's Year Book of 1902) of Venezuela's gold production, in ounces, from 1884 to 1899, inclusive:

Year.	Ounces.	Year.	Ounces.
1884	233,935	1892	46,560
1885	172,037	1893	47,950
1886	217,135	1894	52,925
1887	95,352	1895	47,588
1888	71,594	1896	60,674
1889	88,834	1897	43,500
1890	85,531	1898	39,500
1891	49,050	1899	42,315

These evidently are crude ounces, and it is apparent that the gold product of Venezuela has rapidly diminished since 1884. The average annual production, according to the above figures, is 87,155 ounces, crude.

ECUADOR.

Notwithstanding the fact that gold and silver abound in Ecuador, the annual output of both is exceedingly small. Gold is obtained mainly from alluvial deposits, but the auriferous veins have in recent years been tested on a commercial scale. This Bureau estimated that in 1899 the gold product of the country was 72 kilograms, worth \$47,852, and the silver 240 kilograms, valued at \$9,990. The yield of gold for 1900, as was predicted, more than doubled, reaching the estimated amount of \$107,665.

United States Minister Sampson states that the exports of gold to the United States in 1901 amounted to \$109,954, all of which was produced by the Zaruma mines, and which we assume to have been the entire output of the country.

GOLD PRODUCT OF ECUADOR.

Year.	Ounces.	Value.
1899	2,315	\$47,855
1900	5,208	107,665
1901	5,319	109,954

This Bureau estimated Ecuador's silver production for 1900 at 240 kilograms, of the United States coining value of \$10,000 and the commercial value of \$4,800. In the absence of official data regarding the yield of silver during 1901 it is assumed the quantity was the same as

that of the previous year, namely, 240 kilograms, which, owing to the fall of 2 cents per ounce in the average price of silver in 1901 as compared with 1900, would be worth commercially only \$4,645, the coining value remaining the same, viz, \$10,000.

GOLD MINING IN ECUADOR.

[From Monthly Bulletin, International Bureau of the American Republics, June, 1902.]

The Zaruma mines, at Zaruma, are now the only gold quartz mines controlled by United States capital in the Republic of Ecuador. These mines are in the district of Zaruma, province of El Oro, about 60 miles southeast from Guayaquil, in the western cordillera of the Andes, at from 2,500 to 4,000 feet elevation, and about 30° 45' south latitude. The district contains numerous gold-bearing quartz veins, many of which were worked by the Spaniards one hundred years ago. The principal veins vary from 15 to 16 meters in width. The usual dip is 75° easterly. One system has a course of northeast by southeast, while it is faulted by another with northwest by southeast course. The formation is andesitic.

The ore is mostly blue and white quartz, containing about 10 per cent in sulphides of iron, copper, zinc, and lead. Free gold is occasionally seen. Oxidation occurs very rapidly in the atmosphere. The ores are extracted by two methods—stoping large chambers and filling with surface rock, and stoping small chambers, which are left open until convenient filling is had. The latter method has not yet been extensively tried here. It is necessary to employ methods without timber because of the scarcity of that article and its consequent cost. The common timber of this section rots in a few years.

The ores are treated in a usual type 40-stamp mill; stamps of 850 pounds each. The pulp passes over three 5-foot copper plates for outside amalgamation, and thence to steel cyanide vats. Amalgamation secures about 30 per cent, while 80 per cent of the weight of the pulp (the balance being discarded slimes) yields 70 per cent of the gold in the cyanide method. The slimes and water are separated in large dams adjacent to the vats. A 0.075 per cent cyanide solution is used. In the metallurgy of these ores many features have been encountered which make usual practice of little service. The extraction was for a long time very unsatisfactory.

Freights come from the coast by mules at a cost of \$1 to \$2 per 100 pounds, according to the time of year and class of goods. From January to April the rainy season causes the roads to be very heavy and travel is difficult.

The wages of a common native laborer are 50 cents, gold, while native miners receive from 50 cents to \$2 per day by contract system.

After considerable time spent in developing, construction, experiments, etc., the mines are now in condition to produce and treat large quantities of ore.

BRAZIL.

Mr. Thomas G. Dawson, secretary of the United States legation at Rio de Janeiro, answering this Bureau's interrogatories, states that Brazil's gold production for the calendar year 1901 amounted to 5,568 fine kilograms, according to the most reliable estimates, the official returns for Minas Geraes for the first seven months of the year showing that the State yielded during that time 2,436 kilograms, valued at 5,689 contos. Almost the entire product of Minas Geraes was exported to England. No silver was produced in Brazil, nor are there any refineries.

The product of Minas Geraes, the principal gold district of Brazil, on the assumption that it remained constant throughout the twelve months of the year, amounted, approximately, to 4,176 kilograms, worth 9,752 contos. This sum, however, is evidently expressed in paper contos, whose value fluctuates greatly. Estimated on the average value of 28.4 cents to the milreis, the product of Minas Geraes for 1901 was worth in gold \$2,775,358, which would represent 134,258 fine ounces.

In view of the fact that Minas Geraes produces a large proportion of the gold of Brazil, this Bureau believes that the statement that her

products for 1900 and also for 1901 were incorrectly stated as fine, and that for both years it was only 0.750 fine, as it had been formerly stated. On this assumption the figure for 1900 is changed from 5,011 to 3,759 kilograms fine, and that for 1901 is placed at 4,176 kilograms fine, equal to 134,258 ounces, and worth \$2,775,358.

In 1897, in the absence of all official information, this Bureau estimated the gold production at 58.251 ounces fine, of the value of \$1,204,155, basing the calculation upon the exports of gold bullion, no gold having been brought to the Brazilian mint for coinage. The figure given above represents only the gold shipped to England, but it is believed that all the gold exported by Brazil goes to that country.

In 1898 a statement was received from the United States minister at Rio de Janeiro placing the gold product of Brazil for that year at 3,600 kilograms, an estimate not official, but believed to be approximately correct. Insomuch as this figure is more than double that given for the preceding year, it is believed that these are crude kilograms. It is known that the gold yield of Minas Geraes in former years was 0.750 fine, and on the assumption that this continued to be the average fineness, the product for 1898 would be 2,700 kilograms of fine gold, a figure approximately equal to that derived from a calculation based on the exports for that year.

The yield for 1899 was found (calculated in the same way) to have been 3,234 kilograms. It will therefore be seen that the gold output of Brazil has increased very rapidly during the last five years.

Subjoined is a statement of the country's gold production during this period:

Years.	Kilograms, fine.	Ounces.	Value.
1897.....	1,812	58,256	\$1,204,258
1898.....	2,700	86,805	1,794,418
1899.....	3,234	103,973	2,149,312
1900.....	3,759	120,851	2,498,211
1901.....	4,176	134,258	2,775,358

The estimates in the above table are confirmed by an official statement of the product of Minas Geraes, made by the vice-president of the State and published in the *Economiste Européen* of August 8, 1902.

MINERAL NOTES.

[From Monthly Bulletin of the Bureau of American Republics, April, 1902.]

It is claimed that exceedingly rich veins of gold were recently discovered at Tas-saras, in the municipal district of Villa Rica, about two kilometers from the Ouro Preto mines, in the State of Minas Geraes. According to an analysis made at the School of Mines at Ouro Preto, 470 grams of gold can be obtained from a ton of quartz. This would be equal to \$235 per ton.

BRAZIL.

Gold.—During the past year there have been a number of prospectors and mining engineers through this section in search of new mines or to examine those already in existence. In spite of the great number of places at which gold is found in working quantities, I do not think that much can be done in this line for some years to come. The chief difficulty is the remoteness of the findings from regular lines of traffic or bases of supplies, coupled with the fact that in most instances the gold occurs in hard rock, necessitating modern machinery for its extraction. The cost of transporting and installing a plant would be enormous.

Many of the findings are so situated that water power and electricity might be used to furnish the power, but under present conditions, with the great cost of labor, food, etc., I do not think that many locations would warrant the expense.

MINERAL EXPORTS OF THE STATE OF MINAS GERAES.

[From Monthly Bulletin of the Bureau of American Republics, February, 1902.]

Minas Geraes (newspaper) reports that the measures adopted by the Federal Congress and the State legislature to protect the mining industries are beginning to produce the satisfactory results which were expected.

During the first seven months of 1901 2,435,866 grams of gold, valued at 5,689 contos,^a and 37,915 tons of manganese, representing 1,022 contos, were exported from Minas Geraes. Almost the entire quantity of gold, or 2,331,590 grams, were exported to England, which also imported 13,000 tons of manganese. During this same period the exports of precious stones reached nearly 464 contos.

The financial situation of Minas Geraes has been such as to already allow the Government to remit to Europe 315,297 francs for the payment of the coupons of its foreign loan which falls due July 15.

HISTORICAL SKETCH OF GOLD MINING IN MINAS GERAES, BRAZIL.

[ALCIDES MEDRADO, in the Engineering and Mining Journal, New York, March 29, 1902.]

* * * * *

The first discovery of gold in Minas Geraes was made by Carlos Pedroso da Silva, in the year 1695. In the following year this Paulist discovered the Carmo River, with its abundant alluvial deposits, which even to-day are considered the richest in the State.

If we consider the number of the population attracted to the workings, no other argument is needed to demonstrate the wealth of the superficial gold deposits in Minas Geraes. In the work of Antonil, published in 1711, is preserved the most valuable record of the first decade of the State's existence. The brooks of Ouro Preto, Carmo, and Bento Rodriguez, which at this period were washed for the precious metal, actually justified the hyperbole of Claudio Manoel, "running over sands of gold." The same author gives details of the wealth accumulated by many of the invaders, from which some idea of the richness of the deposits may be formed.

It is said that in these times no river was considered worth working unless a panful of sand gave one-quarter ounce (Portuguese) of gold, worth about \$3.50. Nuggets were common. The architectural achievements—the splendid houses and churches yet remaining—tell of the splendor and luxury of these bygone times.

The seemingly extravagant statements made about the early production on the river das Velhas rest on no less an authority than that of the late Sr. Xavier da Veiga, director of the State archives, a man noted for the severity and high degree of accuracy with which he examined all figures passing through his hands. According to Sr. da Veiga, between 1700 and 1713 the annual tax, including confiscated contraband, amounted to \$197,500. This shows a production of over \$975,000. Between 1715 and 1725 the annual tax had risen to \$225,000, showing a production of \$1,170,000 per annum. For the decade 1725 to 1735 there are no figures available, owing to the removal of books to Rio de Janeiro, but the production, judging from that of the preceding and succeeding periods, could not have been less than \$1,400,000. From 1735 to 1751 the annual output reached \$1,550,000, and from 1751 to 1777, \$1,785,000. From these official data follows the conclusion that in less than seventy years the tax realized over \$40,000,000, showing the production of over \$200,000,000.

The history of colonial gold production resolves itself into that of tax and contraband. The quantity of contraband gold is unknown, but it is known to have reached enormous proportions.

The great difficulty with which the earlier explorers had to contend was the loss from time to time of the run of the deposits which they worked. When they came to a fault they were unable to locate the continuation of the auriferous beds. For this reason the deposits of the river Marianna, one of the richest in the State, remained practically untouched.

The suppression of the slave trade dealt the final blow to the industry. The case in Brazil, in early times, was much the same as in ancient Greece. Not the slightest improvement or advance was made as years went by. The ruins of an abandoned

^aThis value evidently is given in paper contos.

working in Minas Geraes resemble exactly those of the Old World—in Spain, for example, which was to Rome and Carthage what California is to us to-day.

General economic causes decided the abandonment of mining for agriculture. Coffee replaced gold in the statistical returns. The profits were greater and returns more secure. The great advantage which presented itself to the colonist was the ease with which one man could earn a subsistence and the more agreeable character of work in the open air. Many rich workings were deserted in favor of coffee growing in the course of a few years. The lack of intelligent exploitation of properties discredited without reason many rich deposits. A brief inspection of the auriferous belt will satisfy any competent engineer that scarcely one of the thousands of deposits then worked should have been abandoned. It is absurd to suppose that so rich a country can have been exhausted. In Minas Geraes, as in other gold fields, the alluvial gold has been in great part removed, but there still remain the huge mountain veins absolutely untouched. Even now for 30 miles along the banks of the river Carmo one may see, every wet season, thousands of "faiscadores" who gain by their pans a living for their families. The floods continually renew the deposits, and without doubt it is the Ouro Preto hills which furnish the gold so carried down. The famous river Bento Rodriguez, thanks to the surrounding hills, furnishes an equal subsistence to the folk along its banks, and the same is true of other streams through all the central region of the State. It is possible and more than probable that a new era is dawning for this ancient industry. Obstacles in the direction of transportation and labor are gradually being removed, and the modern spirit of association bids fair to cope with difficulties too great for the old workers. Experts who have visited Ouro Preto declare that it is one of the richest gold fields on earth. Not one mine here existing is yet worked out, or near it.

The following figures are extracted from official documents in the archives of the city of Ouro Preto relative to past production of gold:

Gold tax paid in the Villa Rica (Ouro Preto) district in the period of 1735–1751 (sixteen years).....	\$3, 481, 125
Showing a production of.....	17, 405, 625
Gold tax paid in the Marianna district during same period	3, 887, 250
Showing a production of.....	19, 436, 250
Gold tax paid by Minas Geraes during period of 1700–1820.....	53, 529, 750
Showing a production of.....	267, 656, 500

These amounts were divided among the various districts in the following proportions:

	Per cent.
Ouro Preto.....	22
Marianna	25
Sabara.....	23
Other districts	30

These statements include only gold which paid the "quinto" or royal tax. The amount of contraband bullion exported is known to have been large, but it is impossible to estimate it with any approach to accuracy.

PERU, BOLIVIA, AND CHILE.

Owing to the inadequacy of the data regarding the production of the precious metals in Peru, Bolivia, and Chile, it is necessary to have recourse to statements of exports, but as the product of one country may be exported from the seaport of another, it is impossible to determine in every case exactly where the metal was mined. This Bureau endeavors to ascribe the exports to the country of origin, at the same time admitting that it is not always possible to do so. It is believed, however, that the total amount credited to Peru, Bolivia, and Chile represents their aggregate product, although the amounts ascribed separately to each country may vary somewhat from the actual production.

PERU.

As the Peruvian Government prepares no official statistics of the production of gold and silver, this Bureau has hitherto been constrained to estimate the yield from statements of the exports of the

precious metals and of the amounts taken to the mint at Lima for coinage. The silver product, estimated in this manner, for 1897 was 70,122.473 kilograms fine.

In 1897 the free coinage of silver was stopped and the export duty previously existing upon gold and silver was removed; consequently this method of estimating the product is no longer reliable.

Mr. Alejandro Garland, a Peruvian writer of high repute upon financial and other economic questions, estimated the gold product of Peru for 1897 at 945 kilograms, or 30,382 ounces fine, worth in United States money \$628,050, and the silver product at 304,400 kilograms fine, of the coining value, at the ratio of 16 to 1, of \$12,650,864.

This estimate for silver—being very much higher than has ever been credited to Peru in a single year, and in view of the fact that the United States minister, Mr. Dudley, states that there has been an increased production of gold and a falling off in the amount of silver—is given with some doubts as to its accuracy.

The figure finally adopted for the silver production of 1897 was 101,997 kilograms fine, of the coining value of \$4,239,000, and for 1898, 165,000 kilograms fine, of the coining value of \$6,857,400, while Mr. Garland's estimate for gold, viz, 945 kilograms fine, was repeated.

The difference between the estimated production of gold in Peru during 1899, based upon the export of gold and upon the statement of the amount delivered to the mint for coinage, and the amount given by Señor Garland is very great, and in view of the fact that the latter's figures are confirmed by the *Statistique de l'Industrie Minérale* and *Mines and Quarries* for 1898, this Bureau is disposed to accept Señor Garland's estimate. The figure finally adopted for silver, for 1899, was 146,923 kilograms fine, of the coining value of \$6,106,100.

Later data subsequently led to a correction in the figures for 1899 and, as finally accepted, they are: Gold, 1,265 kilograms, or 41,643 ounces, valued at \$860,650; and silver, 203,000 kilograms, fine, of the coining value of \$8,436,700.

The yield in 1900 was, gold, 1,633 fine kilograms, worth \$1,085,290; and silver, 226,973 kilograms, fine, of the coining value, at \$1.29+ per fine ounce, of \$9,333,000.

According to the statement of the United States chargé d'affaires at Lima, there were coined at the Lima mint 81,255 Peruvian pounds of the weight and fineness of the English pound; of this amount, £400 were recoinage, leaving £80,855 of new coinage, of which the *Boletin de Minas* says 95 per cent were derived from native gold; this would give, approximately, 515 kilograms as the amount of domestic gold coined at the mint. The export of gold ore is given as 11,535 kilograms, but the amount of metal contained in this is not stated. The United States chargé d'affaires estimates the production at 2,000 kilograms, fine, an estimate confirmed by the mint authorities. The *Boletin de Minas* says that the gold coined at the mint represented but one-third or one-fourth of the true product. *El Comercio* states that the output of gold in Peru is steadily increasing; therefore, in view of the fact that the figure for 1900, i. e., 1,633 kilograms, fine, is doubtless correct, the estimate of 2,000 kilograms, fine, may be accepted as approximately correct for the product of 1901. Owing to the adoption of the gold standard by Peru and the low charge for coining, very little gold is leaving the country.

Regarding the silver product of 1901, no data has been received. Consequently, in view of the statement that the silver yield has diminished recently, it is estimated to have been, approximately, equal to the average product of last five years, which would make it 174,242 kilograms, fine, of the coining value of \$7,241,525, and the commercial value of \$3,360,524.

The final corrected figures for the production of the precious metals in Peru for the last five years are as follows:

Years.	Gold.		Silver.	
	Kilograms. fine.	Value.	Kilograms. fine.	Coining value.
1897.....	945	\$628, 000	101, 997	\$4, 239, 000
1898.....	945	628, 000	165, 000	6, 857, 400
1899.....	1, 295	860, 650	203, 000	8, 436, 700
1900.....	1, 633	1, 085, 290	226, 973	9, 433, 000
1901.....	2, 000	1, 329, 200	174, 242	7, 241, 500

GOLD AND SILVER MINES IN PERU.

[From Annales des Mines, November, 1901.]

It is only recently that the attention of miners has been directed to gold in Peru, although it is found in abundance in the country. On the coast it is found in ferruginous quartz veins; in the region of the Andes it is generally found associated with silver, copper, and other metals; auriferous alluvium is, moreover, abundant in the same locality. In the country east of the Andes, designated under the name of Montana, gold is likewise found in veins and in alluvium; the veins generally cross Silurian slate, and the alluvial deposits are found in terraces on the sides of valleys or along the banks of streams.

Notwithstanding these facts, gold is being mined at very few places, and still fewer are the places where successful mining is assured.

The provinces richest in gold are Sandia, Cavalaya, Paucartamba, and Pataz. The most promising region on the coast is Camana.

It is difficult to tell the exact amount of the production. As there is a 3 per cent duty on exported gold, much of the gold that leaves the country is never declared; in addition, there is no data concerning the amount used in the country for the manufacture of jewels and ornaments.

According to the customs statistics, the export of gold in 1900 was as follows:

Description.	Weight.	Value.
	<i>Kilograms.</i>	<i>Sols, a</i>
Gold in bars	180. 238	223, 182. 12
Gold in dust and nuggets.....	47. 960	59, 470. 40
Gold ores	2, 905. 000	360, 181. 97

^a2.50 francs.

Estimating the gold contained in the 2,905 kilograms of gold ore at 320 kilograms, we have the total gold exported 548.198 kilograms, representing a value of 1,607,086.25 francs. The amount of national gold coined at the mint in Lima in 1900 was 468.071 kilograms, which produced 63,918 Peruvian pounds and a fraction, or 1,597,950 francs.

If to these quantities, of which the total is 1,016 kilograms, we add the gold which is secretly sent abroad and that which is used in the industrial arts, and taking into account the production of former years, we may estimate the total production of gold in Peru in 1900 at 1,815 kilograms, worth 5,580,000 francs.

* * * * *

In 1897 the Peruvian Government suspended the coinage of silver and immediately afterwards adopted the gold standard. In consequence, the coinage of the Peruvian pound was begun (this coin corresponds in weight and fineness with the English pound).

The amount of gold coinage of the mint at Lima up to June 30, 1901, is shown in the following table:

Years.	Weight (fine gold).	Value.
	<i>Kilograms.</i>	<i>Peruvian pounds.</i>
1898	309.959	42,289.580
1899	252.664	34,505.808
1900	468.071	63,918.744
1901 (first half).....	415.346	57,364.000
Total.....	1,446.040	198,078.132

Silver.—There is probably not a single valley in the Andes in which argentiferous veins, more or less rich, are not found, and the silver in them is generally found in conjunction with other useful metals. Until very recently—that is to say, until the sharp rise in the price of copper—silver was the only metal sought for in these deposits, and these mines appear on the public records only as silver mines; nevertheless, large quantities of lead and copper ores are now derived from them. The following table shows the amount of silver exported in 1900:

Description.	Average.	Weight.	Value.
	<i>Per cent.</i>	<i>Kilograms.</i>	<i>Soles.</i>
Silver bars.....	99	43,591.55	1,743,662.20
Silver sulphides	33	205,238.00	2,119,565.23
Silver ores.....	6	25,859,186.00	5,355,527.54

Reducing these quantities to fine silver and adding 2,000 kilograms, the amount used in the industrial arts, we have a total production of 265,700 kilograms of silver, representing a value of 23,239,387.50 francs.

BOLIVIA.

It is said that gold exists in considerable quantities in Bolivia in alluvial gravel, especially in the eastern valleys of the Cordillera Real, in the upper branches of the La Paz River, and in the valleys radiating from Mount Sorata. It is washed out by the Indians in small quantities. Veins of auriferous quartz are being profitably worked in the Araca Mountain, opposite Illimani. The yield, however, is inconsiderable at present.

In this Bureau's report of the production of the precious metals in 1897 it was assumed, in the absence of official figures, that Bolivia's yield of gold for that year was the same as it was in 1896, namely, 1,128 kilograms, of the value of \$750,000. This estimate, for reasons given in the report of 1898, was subsequently changed to 517 fine kilograms, of the value of \$343,500. This figure, however, represents only the production traceable through export and other figures, and it does not represent Bolivia's entire output of gold.

The yield of 1898 was 504 kilograms, worth \$335,000.

For 1899 Bolivia's gold product was estimated to be equal to her exports, which were 103 kilograms, its value being 88,000 Bolivianos, or \$68,500 in United States money; but the figures ultimately accepted as representing her actual output of gold were 500 kilograms, of the value of \$332,300. The estimates finally adopted for 1898 and 1899 were based upon a report of the Imperial German consul at Cochabamba.

A report from the United States consulate at La Paz states, in answer to this Bureau's interrogatories, that "no statistics of the production

of gold in Bolivia are obtainable, because the greater part, or rather the whole of the production, is exported contraband. However, the total production of gold in Bolivia in one year may be estimated at 546 kilograms, with an approximate value of 273,000 Bolivianos." In United States money this would be \$119,574. This indicates a fine contents of 180 kilograms, which is accepted as the gold product for 1900. The *Statistique de l'Industrie Minérale* for 1900 states that the gold product of Bolivia for 1900 amounted to 226 kilograms, fine, and was worth 778,000 francs, or, approximately, \$150,000 in United States money. This estimate is so close to the amount given by Mr. Barber that it is believed approximately to represent Bolivia's gold production for that year.

In the absence of any data for 1901 the figures of 1900 are repeated, viz, 546 crude kilograms, with a fine contents of 180 kilograms, and worth \$119,574 in United States money.

The assumption that the annual gold product remains fairly constant is warranted by the nature of the gold-mining operations in Bolivia, and this conclusion is sustained by such data as are obtainable.

Owing to the fact that Bolivia prepares no official statistics of the production of the precious metals, this Bureau has hitherto endeavored to determine the amounts by calculations based upon statements of the exports of the precious metals through the Chilean port of Antofagasta, at the same time recognizing the inadequacy of this method. In view of the above statement of the United States consul and of the *Statistique de l'Industrie Minérale*, it is believed that while the figures given in the past for the amount of gold produced have been approximately correct, the fine contents have been estimated too high; the figures therefore are corrected as follows:

Years.	Kilograms.		Value.
	Crude.	Fine.	
1897.....	517	211	\$140, 230
1898.....	504	206	136, 907
1899.....	500	226	149, 854
1900.....	546	180	119, 574
1901.....	546	180	119, 574

Bolivia ranks high as a silver-producing country; in fact, is fourth on the list. In this Bureau's report of the production of the precious metals during 1897 her yield, in the absence of any definite figures for that year, was placed at the same amount as was recorded for 1896, namely, 466,650 kilograms, of the coining value of \$19,393,900.

On the publication of the Chilean statistics—which are very complete, but usually a year late—it was found that the exports of Bolivian silver through the Chilean port of Antofagasta—and the entire product except such as is consumed at home is exported through that port—amounted in 1897 to 7,284,733 fine ounces, of the coining value of \$9,418,645, which added to the Bolivian coinage of 1897 (\$1,189,282) gives \$10,607,927, which, representing 8,204,568 fine ounces, is assumed to have been the product for that year.

From reports made by representatives of the United States Government in Bolivia the silver product for 1898 was ultimately estimated at 10,997,705 fine ounces, of the coining value of \$14,219,255.

The product of 1899 amounted to 10,843,977 ounces, fine, of the coining value of \$14,020,495.

The report received from the United States legation in Bolivia puts the value of the silver product of Bolivia for 1900 at 15,170,292 Bolivianos (commercial value), which would be equal to \$6,801,778 in United States money—representing 10,970,610 fine ounces—at 62 cents per ounce, which is equivalent to the coining value of \$14,184,223. This statement is corroborated by the *Statistique de l'Industrie Minérale* for 1900.

Data for 1901 being wanting, the silver product for that year is assumed to have been equal to the average product for the last four years, the annual yields having been fairly constant. The amount is 10,254,260 fine ounces, of the coining value of \$13,258,032 and the commercial value of \$6,152,556.

A statement of Bolivia's silver product from 1897 appears in the subjoined table:

Years.	Fine ounces.	Coining value.
1897	8,204,748	\$10,607,927
1898	10,997,705	14,219,255
1899	10,843,977	14,020,495
1900	10,970,610	14,184,223
1901	10,254,260	13,258,032

CHILE.

No official figures regarding the production of the precious metals in Chile during the year 1901 have reached this Bureau.

According to Mines and Quarries for 1902, the exports from that country during 1899 were as follows: Gold to the value of 2,496,305 pesos, which, estimating the peso at 36.5 cents, would be equal to \$911,151; and silver of the commercial value of 5,644,819 pesos, equivalent to \$3,917,504.39 coining value. It should be stated, however, that these exports consisted of copper and gold ingots, ore, and matte, gold ore and fine gold, copper and silver ore and matte, silver ingots, ore, and sulphide, and silver-lead ore; in addition there were small exports of copper, gold, and silver ore, which it is impossible to classify.

It will therefore be seen that the values above given consist in part of copper and lead and that they do not exactly represent Chile's exports of the precious metals.

According to the same authority—Mines and Quarries—and taking the peso at the same valuation (36.5 cents), Chile's exports of gold in 1900 amounted to \$1,104,859.38, while the exports of silver amounted to the coining value of \$3,269,073.81. These values likewise consist, in part, of copper and lead, and they show that there was a decrease in the production of the precious metals in Chile in 1900 as compared with 1899.

During 1901 Chile's declared exports of gold and silver to the United States, the United Kingdom, and Germany are given as follows:

Countries.	Gold.	Silver, commercial value.
United States	\$230,861	\$1,468,055
United Kingdom	391,052	1,640,032
Germany	132,256	.....
Total	757,169	3,108,087

In the case of silver there is, however, an obvious error, the reports of the refineries of the United States to this Bureau showing that 6,538,410 fine ounces of silver, of the commercial value of \$3,923,046, were recovered by them from Chilean ore and bullion during the calendar year 1901. It should be stated, however, that probably a very considerable portion of this silver was of Bolivian production, as all the silver exported by that country leaves by way of the Chilean port of Antofagasta. Insomuch as it is impossible to determine what proportion, if any, of this silver originated in Bolivia, the entire amount is credited to Chile. Chile's exports of the precious metals, accordingly, were as follows: Gold, \$757,169; silver, \$5,553,078.

It is estimated that Chile's gold coinage for 1901 amounted to approximately \$310,071, which, added to her exports of gold, would give \$1,067,240 as the value of her product for that year. This is equivalent to 51,628 fine ounces, which is 9,966 ounces, or about 16 per cent less than the average annual production of the last three years. In several years no coinage of silver has been reported from Chile; her production of that metal during 1901 is accordingly assumed to have consisted of the amount exported, i. e., 9,255,130 fine ounces, of the commercial value of \$5,563,078, and the United States' coining value of \$11,966,228, an amount much greater than any hitherto credited to Chile; it should be borne in mind, however, that, as stated above, a portion of this silver may have originated in Bolivia, and also that the estimates for both gold and silver are merely provisional and are subject to future correction.

ARGENTINA.

It is generally believed that the mineral resources of Argentina are great, but thus far the lack of means of internal communication has prevented their development. As railways are extended to the Andes, the mining industry, doubtless, will rapidly expand.

Definite information regarding the production of the precious metals in the Republic has hitherto been lacking, and such figures as this Bureau has been able to offer have been based chiefly on statements of exports of ore and metal and on the remarks of various observers.

In reply to this Bureau's interrogatories, Mr. William P. Lord, United States minister at Buenos Ayres, says: "There are no statistics regarding the production of the gold mines of the country during 1901. It probably would not exceed \$30,000." Of the silver production he also says: "There are no statistics, except of ore exported, valued as follows: Silver, \$12,579, and galenas, \$14,540." He adds, "There is no output of gold and silver from the refineries of the country."

These statements, in conjunction with the fact that there was no coinage executed of either gold or silver within the boundaries of the country, warrant the conclusion that the entire silver product was exported in the form of ore.

Hitherto all the gold obtained in the country has been mined in the Andean region, but the Montevideo Times of October 26, 1901, reports the discovery of gold in the sands on the coast near Cape Virgins. A petition has been presented to the Government asking for

permission to work on an area of 100,000 square meters. A similar petition has been sent in with regard to a section of coast situated between the Cape and Canadon Lucacho, and the Government has also been asked for leave to explore certain regions in Tierra del Fuego, where the presence of minerals, valuable for industrial purposes, is suspected.

Following is a statement of Argentina's production of precious metals from 1897:

Year.	Gold.	Silver (coining value).
1897	\$137,694	\$495,810
1898	137,694	495,810
1899	137,694	495,810
1900	43,659	49,000
1901	30,000	58,400

In consequence of further researches it is believed the estimate for 1897, which was repeated for 1898 and 1899, should be reduced somewhat—that \$300,000 for the aggregate production of the three years would be nearer the truth.

PARAGUAY.

Although there are deposits of valuable minerals, ores, and metals in Paraguay, thus far they have not been worked.

URUGUAY.

The general bureau of statistics of Uruguay states that the gold product of the country for 1901, all of which was apparently mined in the department of Rivera, amounted to 72.146 kilograms, worth \$31,744.24. This valuation would indicate a yield of 1,536 fine ounces.

It is stated that the cyanide process is now being introduced and better results are expected. All the mines are small and are mostly surface workings. In 1900 twenty-five new applications for concessions were filed, all in Cerro Largo, Minas, Maldonado, Canelones, and Florida. The work has been carried on almost exclusively by a French company.

In 1899 the mines in Rivera yielded 5,119 tons, producing 61.37 kilograms of gold.

In 1900 7,345 tons of mineral quartz were worked, producing 71.234 kilograms of gold; in 1901 6,183 tons yielded 72 kilograms.

This gold ran from 0.650 to 0.700 fine. The assays from twelve workings ranged from 104 to 475 grains per ton. Complaint is made of lack of water. The Government gets a percentage on all gold produced.

The above particulars are from a report of United States Consul Swalm, at Montevideo, dated February 26, 1902.

The following table contains a statement of the gold product of the department of Rivera since 1885. It is extracted, in part, from the *Anuario Estadístico de la Republica Oriental del Uruguay*, published

in 1900, the United States value having been computed at this Bureau at the rate of \$1.03424 for 1 peso:

Year.	Weight.	Value.		
		Per kilo-	Total.	United States
		gram.		currency.
	<i>Kilograms.</i>	<i>Pesos.</i>	<i>Pesos.</i>	
1885.....	64.284	500.00	32,142.00	\$33,241
1886.....	85.009	500.00	42,504.00	43,948
1887.....	63.908	500.00	31,954.00	33,047
1888.....	25.734	500.00	12,867.00	13,307
1889.....	139.261	396.80	55,259.31	57,149
1890.....	207.695	418.59	86,938.09	89,911
1891.....	212.883	426.26	90,743.76	93,847
1892.....	121.579	441.16	53,635.97	55,470
1893.....	102.230	444.83	45,474.55	47,031
1894.....	34.511	444.56	15,342.39	15,867
1895.....	61.126	442.39	27,041.32	27,966
1896.....	55.998	446.50	25,002.72	25,858
1897.....	87.336	440.89	38,505.71	39,822
1898.....	74.708	445.00	33,245.06	34,382
1899.....	41.4	.....	.....	27,514
1900.....	46.	.....	.....	30,842
1901.....	47.7	.....	.....	31,744

The figures for the last three years are taken from the reports of the United States minister, which are based upon information received from the ministry of foreign affairs of Uruguay.

Uruguay's silver production is comparatively insignificant; it is estimated at 800 fine ounces of the commercial value of \$480 and the United States coining value of \$1,034.

EUROPE.

RUSSIA.

In answer to this Bureau's interrogatories, Mr. Charlemagne Tower, United States ambassador at St. Petersburg, states that in 1901 Russia produced fine gold to the amount of 2,098 poods, 39 pounds, 32 zolotniks, 80 doli, worth 44,408,247 roubles, 36 copecks, equivalent to 34,382.389 kilograms. This amount would be worth \$22,850,536 in United States money.

The silver production for the same period amounted to 298 poods, 6 pounds, 16 zolotniks, 32 doli; worth 271,386 roubles, 36 copecks (Russian coining value), equivalent to 4,883.912 kilograms, of the United States coining value of \$202,981, equal to 156,993 fine ounces, of the commercial value of \$94,196.

In 1897 Russia produced 34,977 kilograms, or 1,124,511 ounces, of fine gold, valued at \$23,245,700, and 8,856 kilograms, or 284,625 ounces, of silver, of the coining value of \$368,000. The product of 1898 was 34,166 kilograms, or 1,098,437 ounces, of gold, worth \$22,706,700; and 8,664 kilograms, or 278,492 ounces, of silver, of the coining value of \$360,100. The yield for 1899 was: Gold, 33,354 kilograms, or 1,072,333 ounces, of the value of \$22,167,100; silver, 4,196 kilograms, or 134,887 ounces, of the coining value of \$174,400. The product of 1900 was: Gold, 30,312 kilograms, or 974,537 ounces, worth \$20,145,500; silver, 4,458 kilograms, or 143,299 ounces, of the United States coining value of \$185,300.

The above data, for comparison, are presented below in tabular form:

Year.	Gold.		Silver.	
	Kilograms.	Value.	Kilograms.	Coining value.
1897	34,977	\$23,245,700	8,856	\$368,000
1898	34,166	22,706,700	8,664	360,100
1899	33,354	22,167,100	4,196	174,400
1900	30,312	20,145,500	4,458	185,300
1901	34,383	22,850,915	4,884	202,981

From the above it will be seen that during the last five years Russia's gold yield has been fairly constant, although there was an appreciable decrease in 1900. The average for the period was 34,382 kilograms, and it will be seen that the product for 1901 was slightly above the average. The silver production, on the contrary, has varied considerably, and the yield for 1901 was almost 22 per cent less than the average for the lustrum.

The production of gold in Russia, from 1816 to 1880, by periods of five years and, subsequently, by years:

	Kilograms, fine.		Kilograms, fine.
Periods:		Years:	
1816-1820	1,269	1885.....	29,348
1821-1825	9,466	1886.....	29,734
1826-1830	22,167	1887.....	30,985
1831-1835	30,522	1888.....	31,257
1836-1840	34,469	1889.....	33,118
1841-1845	80,846	1890.....	34,998
1846-1850	121,543	1891.....	34,745
1851-1855	113,371	1892.....	38,223
1856-1860	122,158	1893.....	39,884
1861-1865	107,026	1894.....	38,172
1866-1870	134,131	1895.....	36,543
1871-1875	156,937	1896.....	33,076
1876-1880	180,766	1897.....	34,977
Years:		1898.....	34,166
1881	32,677	1899.....	33,354
1882	32,138	1900.....	30,312
1883	31,887	1901.....	34,383
1884	31,719		

The average annual production of fine gold in Russia, from 1816 to 1901, inclusive, has been 21,154 kilograms, the low average being due to the small production of the earlier years of the period. The product for 1901 was nearly 63 per cent greater than the average for this period, but the average for the last twenty-one years—1881-1901—being 33,552 kilograms, the production for the final year of the period was only about 2½ per cent greater than the average. During this period the production has remained remarkably constant.

Production of silver in Russia, from 1822 to 1901, inclusive, by periods of five years:

Period.	Kilograms, fine (approx- imately).	Period.	Kilograms, fine (approx- imately).
1822-1825	66,930	1861-1865.....	77,542
1826-1830	85,211	1866-1870.....	73,306
1831-1835	93,780	1871-1875.....	51,731
1836-1840	89,239	1876-1880.....	49,801
1841-1845	88,172	1881-1885.....	40,262
1846-1850	83,896	1886-1890.....	61,996
1851-1855	77,204	1891-1895.....	45,097
1856-1860	78,224	1896-1900.....	33,204

The annual average production of silver in Russia from 1822 to 1901, inclusive, is only 13,906 kilograms, fine, representing a United States coining value of \$577,933. The greatest yield was during the period 1831 to 1835, when the annual average was 18,758 kilograms. Since that time there has been a steady and rapid decrease, with the exception of the period 1886-1890, when the average was 12,999 kilograms, until the present, the average for the lustrum—1896-1900—being only 6,641. It will be seen that the product for 1901—4,884 kilograms—is only about 35 per cent of the annual average since 1822, and is only about 74 per cent of the annual average production of the last period, 1896-1901.

THE GOLD-MINING INDUSTRY OF SIBERIA.

[The Board of Trade Journal, January and February, pp. 211, 253.]

The following particulars relating to the gold-mining industry of Siberia are taken from a publication entitled "Russia, its Industries and Trade," issued by order of M. de Witte, imperial Russian minister of finance:

Alluvial gold deposits.—In the Ural region gold is procured in the governments of Orenburg and Perm. In that of Orenburg the extraction of gold is conducted on a small scale, and the majority of the gold beds are worked by small gangs of workmen. The deposits in this region are nowhere of any great depth or extent, and are not generally situated in the valleys of rivers, but in plains, or near the summits of mountains or on their slopes, forming separate and independent, but small, beds of irregular outline. Gold extracting on a more extensive scale is carried on in only very few places, such as the Miass industries. In this government numerous veins of native gold deposits occur, and there is no doubt that in course of time the extraction of the metal from the veinstone is bound to develop considerably. At present this government yields about 6,264 pounds (English) of alluvial gold, and 3,852 pounds of vein gold per annum. The average proportion of gold per ton of alluvium is 0.036 ounce, and that of veinstone 0.282 ounce.

In the Perm government the deposits are, for the most part, of inconsiderable extent, while the proportion of gold contained in a ton of auriferous rock varies considerably. The average is 0.038 ounce per ton of alluvium, and 0.267 ounce per ton of veinstone. The present annual yield in the government of Perm is about 10,224 pounds from alluvial deposits and 1,728 pounds from vein ores. In western Siberia the deposits, for the most part, contain a small proportion of gold. The beds are narrow, shallow, and unequal, with frequent interruptions. Here, too, the prevailing mining enterprises are only on a small scale. The average amount of gold contained in a ton of rock is about 0.024 ounce in the alluvium and 0.324 ounce in the veinstones. At present the annual yield of gold in western Siberia amounts to about 5,616 pounds obtained from the alluvium and 432 pounds from vein ore.

The deposits of eastern Siberia, which are situated in the Yakutsk province, and those of the region of the Amur, the Nerchinsk district, and the maritime province, are remarkable both for their richness and their extent. Mining is here conducted on a large scale, and all the conditions exist for the development of the industry. The wealth of the gold-bearing deposits situated along the rivers Lena and Amur and their tributaries is in the breadth of the deposit, the depth of the layers, and the quantity of gold contained. Those of the mountain ranges of eastern Siberia are frequently from 700 to 1,400 feet and more in breadth; the layers have a thickness of from 4 to 6 feet, which does not vary either lengthways or breadthways; while the average proportion of gold per ton of sand is from 0.184 to 0.282 ounce, and sometimes more, so the annual yield of gold from such beds amounts to 3,600 pounds and over. The bulk of the gold, 24,264 pounds, in fact, is procured in the Olekminsk district, in the southwestern portion of the Yakutsk province. Here we find underground mining carried on, the more important gold-extracting plants being engaged in the working of beds situated some distance below the surface, which are at the same time the richest in gold. The entire layers of turfs and auriferous alluvium are frequently frozen throughout, at other times the bed is thawed, while at other places again the two classes of rock alternate.

The second place among the gold-yielding areas is taken by the Amur region, which yields about 12,924 pounds of gold. The auriferous beds in the Amur gold fields are generally very favorably situated for working, as they are for the most part quite near the surface, subterranean mining being necessary in very few places. The average yield of gold is 0.094 ounce to the ton of rock, and in some places 0.282 ounce and upward.

The third place in order of importance is held by the maritime province, with an annual production of about 5,940 tons, and an average proportion of 0.149 ounce of gold to the ton, which rises in some places to 0.329 ounce. The gold-extracting industry in the maritime region has grown considerably, having increased four and a half times during the last eight years.

The fourth place is occupied by the Transbaikal region, together with the district of Nerchinsk, where up to 7,056 pounds of gold are produced annually.

In eastern Siberia the average annual quantity of gold produced is about 57,780 pounds, with a proportion of about 0.094 ounce to the ton.

Conditions of working the gold deposits.—The principal conditions regulating the extraction of gold at the present time are as follows:

While full liberty is granted to prospect and work the beds of auriferous sand and gravel and the veins of gold-bearing quartz, etc., to all owners of land, or to individuals having their authority to do so, and while the only requirements made are that the works should be conducted without danger of injury or loss of life to the persons employed therein, and that a certain fixed tax should be paid to the treasury, the law requires the observance of certain formalities in the case of land belonging to the Crown or to His Imperial Majesty's cabinet in the Altai and Nerchinsk districts.

Gold fields and areas containing vein gold, situated on Crown land or on land belonging to His Majesty's cabinet, can not be obtained as perpetual possessions by private persons, but can be leased until such a time as the gold is exhausted. The gold digger does not acquire a title in fee simple to the area.

Gold digging may be engaged in by all persons, of whatever class, possessing rights of citizenship, whether they be Russian subjects or foreigners, with the exception of Jews. Every individual who is desirous of engaging in the work of gold extraction is required to procure a permissive certificate from the mining administration. Any locality not occupied for the purpose of prospecting and not previously applied for is open to exploration for gold, and may be occupied as follows: In case of alluvial beds, an area not exceeding 3.3 miles in length along a valley or river, and of the breadth of the valley, and in that of vein ores the area in all directions within a radius of 0.66 of a mile from a post sunk by the prospector. If the prospector should subsequently desire to acquire the area he has prospected with a view to exploration, he is required to report the deposit, whether it be alluvial or vein gold, to the police authorities of the district or circuit in which it is situated.

Such report, if it satisfies all the rules according to which it is to be made, confers the right of obtaining a legal allotment of the area.

The allotment is made according to the declaration from the starting point fixed in the same and in an upstream direction. The area allotted in the case of vein mines is fixed at forty-four hundredths of a square mile, the breadth not being less than one-third of the length. In the case of alluvial gold mines, the length of the allotment may not exceed 3.3 miles, while in European Russia the total area must not be more than 1 square verst.

The method of working the mines is left to the discretion of the owner, with the reservation that the working, whether of open or underground deposits, must be conducted under conditions involving no danger to the health or life of the persons engaged.

With regard to utilization of the water supply special rules are enforced, the object of which is to regulate the consumption by the several mines of the supply of water, without which the extraction of gold is impossible.

The gold extracted on private land is subject to a tax payable to the imperial treasury, while that procured on land belonging to the Crown or His Imperial Majesty's cabinet pays, in addition to the tax, a certain fixed sum to the Crown or the cabinet for the use of the land. The tax on gold extracted is levied in kind, according to the quantity of gold and silver contained in the alloys of those metals, upon silver and gold separately. Gold diggers in the Olekshin district of the province of Yakutsk, as being the richest in gold deposits, are taxed 10 per cent on the yield and £1 1s. 2d. per dessiatina (2.7 acres) of Crown land allotted to them. In the Amur region the tax amounts to 5 per cent and 10s. 11d. per dessiatina, while in all the other parts of Siberia and European Russia it is 3 per cent and 2s. 2d. per dessiatina.

Gold fields situated on the property of His Imperial Majesty are divided into three classes, according to the quantity of gold obtained, and are taxed from 5 per cent to 15 per cent in kind and 4d. per linear sazhen (7 feet) of the length of the allotment.

Diggers are required to forward the gold extracted to the Crown metallurgical laboratories, which are established at Ekaterinburg, Tomsk, and Irkutsk, where the gold is melted and forwarded to the mint at St. Petersburg. In return, the owner of the allotment receives a certificate, known as an assignat, against which, after the expiration of a certain period (from five to six months) he is entitled to receive from the

mint either coin or gold in ingots. The assignats referred to may be mortgaged and transferred both to private individuals and to banks and other similar institutions by special or blank indorsement, and are accepted in payment of custom duties. The cost of forwarding the gold to the mint and its manufacture into coin and ingots is defrayed by the owners of the allotments.

Thus, in the first place, gold diggers are not permitted to dispose, at their own discretion, of gold obtained by them; and, in the second place, they are mulcted in a very heavy tax, which is levied on the total yield, without reference to the relative lucrativeness of the industry.

New regulations as to gold-mining taxation.—With a view to aiding the developing of the gold-producing industries the Government has of late years undertaken a series of exceedingly important reforms, as follows:

1. From the year 1902 the proportion of the tax on each dessiatina will be considerably reduced, thus the gold fields of the Oleshin circuit will be charged at the rate of 5s. 5d. for each dessiatina (2.7 acres); in the Amur region the tax will be reduced to 3s. 3d.; in the maritime province to 2s. 2d., and in other places to 1s. 1d. In this manner the tax per dessiatina is, generally speaking, reduced to about one-half, and in those parts where unfavorable conditions for the extraction of gold obtain the tax will be three and a half and even four times lower than it is at present.

2. Commencing from the year 1902 the royalties levied on gold in kind will be abolished and an industrial tax will be substituted for it. This tax will be imposed in proportion to the relative profitableness of the undertakings, and the owners of the allotments will participate in the apportionment of the tax. At the same time the industrial tax in question will represent a sum considerably below the amount at present collected by the Government in the taxes which are levied in kind.

3. Simultaneously with the abolition of the mining tax the obligation to deliver the gold obtained from the allotments by private individuals to the Government laboratories and the mint is removed, and the free circulation of raw gold introduced in its place.

The laws above referred to do not extend to gold fields exploited by private individuals on the land belonging to the cabinet of His Imperial Majesty, and to some of the circuits of the Transbaikal region, as the mining tax on gold procured on lands situated in these regions forms part of the revenue of the cabinet.

4. Private individuals are permitted to establish laboratories and every other description of plant for the reduction of gold and the separation of gold, silver, and platinum. At the same time the Government proposes to increase the number of its laboratories.

5. Project of improved legislation dealing with the gold and platinum industries has been elaborated, the result of which will be to do away with a number of the formalities which at present hamper the activity of the industries.

6. Extensive researches into the geological and topographical characteristics of the gold-yielding regions are being undertaken in western and eastern Siberia, together with statistical, economical, and technical investigations, and, at present, the description and plans of several gold-yielding regions are in process of publication.

GOLD IN RUSSIA.

[From the Commercial and Financial Chronicle, New York, April 12, 1902.]

The following figures regarding the gold production of Russia for 1901 (Russian style) are taken from the gazette of the Russian minister of finance, which in turn derives its information from the report of the minister of agriculture and Government domains.

There was offered the imperial assay offices at Irkutsk, Tomsk, and Ekaterinburg, gold as follows:

	Poods.	Pounds.
From Eastern Siberia	1,280	36
From Western Siberia	359	22
From the Ural	539	19
From private hands of the Emperor	141	25
Tendered by the Imperial Bank, the Russo-Chinese Bank, and bought of prospect- ors	39	18
Total	2,361	.....

This is the smallest product since 1889, except that of 1896. Beginning with 1886, when the total was 2,019 poods, the gold production of Russia steadily increased up to 1893, when the total was 2,798 poods, the highest on record (except that of 1895) since the statistics of gold production have been kept in Russia. Since 1895, when the product was 2,907 poods, the output has steadily diminished. The average for ten years is 2,440 poods, hence the product of 1901 fell 79 poods, or about 3.2 per cent. The decline was chiefly in Eastern Siberia. The actual official value of the product for the year is given at \$23,464,562, which would be equivalent to 1,135,100 fine ounces.

[From Board of Trade Journal, London, March 27, 1902.]

According to the Journal de St. Petersburg of February 14 and 27, rich auriferous deposits have recently been discovered in the basin of the Olekma, a tributary of the Lena. From certain of these deposits as much as 20 zolotniks of gold have been extracted from 100 poods of rock, or about 1.7 ounces per ton.

FINLAND.

[From Bidrag till Finlands Officiella Statistik, XVIII; Industri Statistik, 17, 1900.]

Finland in 1900 produced 2,174 grams of gold, worth 6,956 Finnish marks (\$1,342 in United States money), all of which was obtained from washings, which gave temporary employment to 40 men. The yield for 1900 was about 18 per cent less than that of the preceding year. The entire product of the Grand Duchy from 1871 to and including 1900 is 434,077 grams, valued at \$267,219.

In 1900 silver, obtained as a by-product in copper smelting, was produced to the amount of 250.5 kilograms, worth \$5,318. This was slightly in excess of the production of 1899.

PRODUCTION OF GOLD AND SILVER FOR THE LAST TEN YEARS.

Year.	Gold.		Silver.	
	Weight.	Value.	Weight.	Value.
	Grams.	Finnish marks.	Kilograms.	Finnish marks.
1891	8,768	28,057	1,038.32	100,000
1892	4,807	15,382	920	90,000
1893	4,120	13,184	888.83	88,000
1894	6,471	20,607	877.54	87,000
1895	9,926	31,765	450.81	45,000
1896	7,115	22,768	375.33	37,000
1897	4,593	14,697	381.19	35,000
1898	4,619	14,780	455.58	48,860
1899	2,620	8,384	244.25	26,000
1900	2,174	6,956	250.5	27,555
1901	2,174	6,956	250.5	27,555

As no figures have been obtained for 1901, those for 1900 are repeated, and in the value assigned the silver yield of 1901 in the above table no allowance is made for the fall in the price of that metal, the difference being inconsiderable.

NORWAY.

The gold product of Norway is exceedingly small and it has steadily and, with the exception of the year 1896, rapidly diminished since 1889.

Under date of April 2, 1902, United States Minister Thomas writes that "the yield for 1901 was comparatively insignificant," giving no figures.

Following is a statement of the production since 1889:

GOLD.

Year.	Weight.	Value.
	Kilograms.	Crowns.
1889		33,000
1890		43,300
1891		24,000
1892		36,500
1893		22,000
1894		3,500
1895		8,000
1896	14.26	35,000
1897	1.27	2,500
1898	2.86	5,700
1899 "	4.34	10,000

" The figures for 1899 are quoted from Mines and Quarries for 1902.

SILVER.

Regarding silver, the minister writes:

At the Kongsberg Silver Works there was produced from April 1, 1900, to March 31, 1901, about 5,161 kilograms fine silver, which was sold for 393,137.09 crowns. At other works, as far as is known, there has not been any regular production of any importance.

The United States coining value of the yield of 1901 is \$214,491, and the commercial value \$99,537.

The Kongsberg mines have long been famous for their native silver, which is sometimes met with in masses of considerable size. The picked stuff sent to the smelting works contains 70 per cent of the precious metal.

Norway's production of fine silver since 1889 is exhibited in the annexed table:

	Kilograms, fine.
1889	5,350
1890	5,080
1891	4,680
1892	4,810
1893	4,770
1894	4,760
1895	5,000
1896	4,664
1897	5,372
1898	4,802
1899	4,598
1900 (estimated)	5,377
1901 (estimated)	5,160

The estimates for the last two calendar years are based on the monthly averages, as the reports are for fiscal years, which do not coincide with the calendar years.

SWEDEN.

Replying to this Bureau's interrogatories, the minister of the United States at Stockholm, Mr. W. W. Thomas, jr., states that Sweden produced in 1901, 62.723 kilograms, or 2,017 ounces of gold, and 1,680.2 kilograms of silver. Assuming these to have been fine kilograms, the total respective values would be \$41,685 and \$32,404, commercial value.

Regarding the product of 1900, the Report on Mining in Sweden (Bidrag till Sveriges Officiella Statistik. (C) Bergshandteringen, 1900, p. XIV), states that of the 88.483 kilograms of gold produced, 82.389 kilograms were obtained from copper ores, and the remaining 6.094 kilograms from silver and lead ores.

The appended tables contain a statement of the gold and silver production of Sweden since 1861:

GOLD.

Period.	Annual averages.	Period.	Annual averages.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1861-1865	14.895	1881-1885	24.796
1866-1870	8.232	1886-1890	77.577
1871-1875	5.133	1891-1895	93.895
1876-1880	5.776		

Year.	Annual production.	Year.	Annual production.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1894	93.603	1898	125.937
1895	85.291	1899	106.245
1896	114.529	1900	83.483
1897	113.318	1901	62.723

SILVER.

Period.	Annual averages.	Period.	Annual averages.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1861-1865	1,128.9	1881-1885	1,713.0
1866-1870	1,185.3	1886-1890	4,254.2
1871-1875	779.9	1891-1895	3,478.1
1876-1880	1,116.9		

Year.	Annual production.	Year.	Annual production.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1894	2,869.5	1898	2,032.9
1895	1,188.0	1899	2,290.3
1896	2,082.3	1900	1,927.4
1897	2,218.2	1901	1,680.2

GREAT BRITAIN.

No official data have reached this Bureau regarding the production of the precious metals in the United Kingdom in 1901; the estimates for 1900, therefore, are repeated: Gold, 415 kilograms, valued at \$276,200, and silver, 6,896 kilograms, of the commercial value of \$137,400; these figures, however, are only provisional and are subject to future revision.

GERMANY.

In this Bureau's report of the world's production of the precious metals during 1897, German refineries were credited with an output of 2,781 kilograms of gold, obtained as follows:

	<i>Kilograms.</i>
From domestic ores	112
From foreign ores	715
From domestic and foreign ores and waste (Abfälle)	1,954
Total	2,781

The first and last items having been ascribed to Germany, her production of gold for that year was stated at 2,066 kilograms, for the reason that, while only 112 kilograms were directly traceable to domestic ores, it was necessary in a statement of the world's production to take account of the 1,954 kilograms of undetermined origin, and there was apparently no better way than to ascribe it to Germany.

The amount of metal derived from German domestic ores is insignificant.

Further investigation led to the conclusion that the chief item—"gold extracted from domestic and foreign ores and waste (Abfälle)"—was to a very large extent derived from old gold and from miscellaneous manufacturing establishments, and consequently that it had at some time already been taken into account in the estimate of the world's production, and the statement of Germany's production subsequent to 1897 was based upon this conclusion. Accordingly, Germany's production for 1897 is now estimated at 112 kilograms, fine.

Germany's silver product from her own mines during 1897 was 171,048 kilograms, of the coining value of \$7,108,760; in 1898 it was 173,330 kilograms, of the coining value of \$7,203,576; in 1899 it was 194,154 fine kilograms, of the coining value of \$8,070,533, while in 1900 the product was 5,411,441 fine ounces, of the coining value of \$6,996,611.

In answer to this Bureau's interrogatories for 1901, Mr. John B. Jackson, United States chargé d'affaires at Berlin, states—basing his report upon official figures—that the gold product of the refineries of the Empire amounted to 2,755.47 kilograms, fine, valued at 7,687,984 marks. Of this amount, 90.09 kilograms were obtained from domestic and 420.14 kilograms from imported ores; the amount obtained from sweeps and as a by-product was 2,245.24 kilograms.

Following the method observed in former years and described above, we place 90.09 kilograms to the credit of Germany. The 420.14 kilograms extracted from foreign ores has been duly ascribed to the country whence it was exported.

The silver amounted to 403,796.48 kilograms, fine, valued at 32,519,018 marks. From domestic ores were obtained 171,777.63 kilograms, and from foreign, 197,967.99, while from domestic and foreign tailings and sweeps 34,050.86 kilograms were recovered. The portion derived from foreign ores duly appears in the estimate for the countries whence they originated, and as the 34,050.86 kilograms doubtless was largely derived from domestic sweeps it is disregarded in the statement of the world's production. Germany's silver yield for 1901 is therefore set down as 171,777.63 kilograms, fine, of the United States coining value of \$7,139,078.30 or the commercial value of \$3,312,986.

The following table contains a statement of Germany's production of the precious metals from 1897:

Year.	Gold.		Silver.	
	Kilograms, fine.	Value.	Kilograms, fine.	Coining value.
1897	112	\$74,435	171,048	\$7,108,760
1898	111	73,600	173,330	7,203,576
1899	112	74,435	194,154	8,070,533
1900	99	65,796	168,350	6,996,611
1901	90	59,814	171,778	7,139,094

AUSTRIA-HUNGARY.

According to official information received by this Bureau, Austria in 1901 produced 143,324 kilograms of gold ore, worth 31,814 crowns, which would represent 9.72 kilograms of fine gold, while her yield of silver ore amounted to 21,551,400 kilograms, worth 3,663,171 crowns, which would be equal to 38,481 kilograms, fine, representing a coining value (at \$41.56 per kilogram) of \$1,599,263, the calculation being based on a United States gold value of 20.26 cents per crown. The commercial value would be \$742,158.

In 1901 Hungary yielded 3,205 kilograms of fine gold, worth 10,808,256 crowns, at 3,372 crowns per kilogram, which is slightly in excess of the United States Mint valuation, which at \$664.60 per kilogram would be \$2,130,043. During the same year the silver mines of Hungary produced 23,637 kilograms of fine silver, of the commercial value of 2,694,618 crowns, at 114 crowns per kilogram; this would represent a United States coining value of \$982,354, or an approximate commercial value of \$456,000.

Appended is a statement of the production of the precious metals in the Austro-Hungarian Empire from 1897:

Year.	Gold.		Silver.	
	Kilograms, fine.	Value.	Kilograms, fine.	Coining value.
1897	2,993	\$1,989,000	67,952	\$2,824,100
1898	2,798	1,859,500	56,443	2,345,700
1899	2,925	1,943,900	58,961	2,450,000
1900	3,223	2,141,900	61,871	2,571,300
1901	3,215	2,136,692	62,118	2,581,617

PRODUCTION OF THE PRECIOUS METALS IN BELGIUM.

[Translated from the report for 1901 of the commissioner of the Belgian mint to the minister of finance and public works.]

From 1872 to 1884 the Société de la Vieille-Montagne extracted from the argentiferous galenas at the mills of Moresnet, in Belgium, a small quantity of silver, on the average 30 kilograms a year. This production has stopped. Three refineries in the provinces of Liege and Limbourg (at Bleyburg, Sclaigheaux, and Overpelt) are working argentiferous minerals of foreign extraction.

In 1901 the product of these establishments amounted to 45,075 kilograms. In addition, the refinery at Overpelt extracted from argentiferous minerals 30,572 kilograms of gold.

The total production for the thirty-seven years, 1866 to 1901, was about 600,000 kilograms of fine silver.

A fourth refinery, established at Hoboken, near Antwerp, confines its work to extracting the silver from pigs of lead imported principally from Spain. From 1888 to 1900 its production amounted to 829,785 kilograms.

IMPORTS AND EXPORTS OF PRECIOUS METALS.

[According to custom-house reports.]

GOLD.

Year.	Ore.	Bullion.	Coin.	Total.
	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>
Imports:				
1890	10,700	2,900	300	13,900
1899	50	1,100	1,200	2,350
1900	1,200	1,700	700	3,600
Exports:				
1870		12,300		12,300
1880		100		100
1890		100	100	200
1899		500	1,600	2,100
1900		500	1,000	1,500

SILVER.

Year.	Ore.	Bullion.	Coin.	Total.
	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>	<i>Kilograms.</i>
Imports:				
1870		177,300	264,400	441,700
1880		28,300	1,400	29,700
1890	217,000	7,000	22,900	246,900
1899	2,522,900	105,700	306,800	2,935,400
1900	921,500	11,400	183,100	1,116,000
Exports:				
1870		37,400	6,200	43,600
1880		1,000		1,000
1890	900	5,300	21,100	27,300
1899	100	54,300	337,000	391,400
1900		38,300	32,600	70,900

THE NETHERLANDS.

[From Consular Reports, February 7, 1902, p. 8.]

Consul Listoe sends from Rotterdam, January 11, 1902, translation of an article which has lately appeared in several of the Dutch newspapers, as follows:

"The provincial government of Overysel has received a request for a concession to develop a mining field in the community of Hellendoorn, Overysel, which has an area of 2,046 hectares (5,056 acres). The petitioners offer, in case of deep mining, to pay the owners of the soil a remuneration of 12.50 florins (\$5) per hectare, and in case of surface mining 400 florins (\$160) per hectare."

FRANCE.

France produces no gold. Under date of April 18, 1902, the United States ambassador writes that "the silver produced from the mines of the country during 1900 was 85,646 kilograms of fine silver," which represents a coining value of \$3,559,448—by far the largest amount France has produced in recent years.

During the same year the refineries, according to the declaration of their owners, produced 203 kilograms of fine gold, valued at 699,000 francs or \$134,914, all of which was extracted from imported ores.

The amount of silver, 85,646 kilograms, reported by Ambassador Porter, represents the entire output of the French refineries, that derived from imported as well as domestic ores. The amount obtained from the latter was, according to the *Statistique de l'Industrie Minière* for 1900, 14,067 kilograms, fine, of the coining value of \$584,624 and the commercial value of \$271,300.

In the absence of any data for 1901 we assume the yield that year to have been the same as it was in 1900. France's silver product since 1897, therefore, was as follows:

Year.	Kilograms, fine.	Coining value.
1897	16, 890	\$701, 948
1898	14, 340	596, 970
1899	14, 500	602, 620
1900	14, 067	584, 624
1901	14, 067	584, 624

SPAIN.

Statements of the production of the precious metals in Spain are conflicting, and in the absence of any official data regarding the output for 1901 this Bureau is compelled to repeat for that year the estimates published in its report for 1900, namely: Thirteen kilograms of fine gold, valued at \$8,600, and 99,095 kilograms or 3,185,316 fine ounces of silver of the commercial value of \$1,911,189 and the United States coining value of \$4,118,400.

SPAIN AND ITS MINERAL RESOURCES.

GOLD.

PARAMO GOLD MINES.

[From the Mining World and Engineering Record (Supplement), London, April 26, 1902.]

An alluvial gold mining property, which appears to possess every one of the natural advantages for economical and highly profitable working, has recently been acquired at Paramo, in the province of Leon, and will be exploited with British capital. This concession consists of an immense bank of alluvial over 300 feet in height and a great plateau, which has been proved to carry gold wherever tested.

The richness of this plain was evidently fully appreciated in ancient times, and the remains of gigantic operations can be clearly traced. Water had been brought in from a great distance by canals, and at the western extremity of the plain, where it ends suddenly in steep bluffs, two great valleys have been sluiced away. The water channels employed for this purpose are still visible and are now used as country roads. Millions of tons of earth must have been washed here, and with satisfactory results, even with the imperfect appliances then in use, or otherwise work on such a gigantic scale would never have been undertaken. On the lower ground, near the bridge, very extensive sluicing operations have also been carried on in ancient times, and a water race has been brought from some 3 miles away.

This water race could be repaired at little cost and sluicing be begun here on a large scale with a very small expenditure compared with what is usually necessary in such operations. Along the river on both sides are level stretches of alluvial, formed by the eating away of the higher ground by the winter floods, and these deposits carry gold from the grass roots down. A quantity of between 20 and 25 tons of concentrated sand have been obtained by means of two large and two small roughly made cradle machines. General samples taken from the concentrates and hand washed gave a value of equal to $1\frac{1}{2}$ ounces of gold, worth 120s., per ton. It was estimated that 10 cubic meters of alluvial earth gave 1 ton of concentrates. This would work out at about 12s. per cubic meter of earth, or, after deducting liberally for stones and boulders, 4s. per cubic meter of the whole mass of alluvial washed. The average of several tests made by Mr. Mactear showed that the ground now being washed may be calculated to give 10s. per cubic meter, but taking it at 5s. only, the lowest figure actually obtained by these trial washings, the alluvial would show a yield from each machine of 40s. or one-half ounce of gold per day, at a cost for labor of 3s. 4d. New machines, which are badly required, would give

from 1 to 1½ ounces (worth £4 to £6) per day per machine. Against this the cost for labor may be put at 5s. per day per machine. "It would be difficult," says Mr. Mactear, in concluding his report, "to find an alluvial property more advantageously situated, with ample water at suitable levels, canals already in existence, deep alluvial, a splendid outfall for the 'tailings,' and a rapid stream to carry them off. There is also no vexatious legislation in regard to the fouling of the stream, etc., and I consider that these concessions are of the highest value and will yield large profits, even if worked upon a somewhat small scale, while if worked on a scale commensurate with their immense size it is difficult to estimate the amount of the profits which could be realized, the alluvial deposits being practically inexhaustible."

KINGSTON GOLD MINES.

There are two important concessions known as Trones and Florez, comprising together 135 claims of 333 acres, in the municipality of Puente, De Domingo, Florez, in the province of Leon. These properties are well situated on the banks of the river Sil and its tributaries, and are very accessible, being close to the railway of Ponferrada. The alluvial deposits cover almost the whole of the area of the concession. The average of the assays made of the alluvial deposits give 5 pennyweights of gold per cubic yard, but the engineers state that taking the average at only 1½ pennyweights per cubic yard these properties ought to give a large return per annum.

MORALEJA GOLD-BEARING ALLUVIAL CONCESSION.

* * * * *

The two properties known as Barbantes and Acha, comprising 208 acres, in the province of Orense, have already been tested with the most satisfactory results. The engineers have based their calculations on the uniform depths of the deposits of 15 feet, but in most places they are far deeper, and it is reported that nearly the whole of the ground will pay well to work. The tests have given an average return of 5 pennyweights of gold per cubic yard, but the facilities for working and handling the ore are so favorable that if only a quarter of that estimate is realized the profits of the company will be enormous. It is proposed to dispatch immediately six gold-washing machines to the property, which will be capable of treating 150 cubic yards per day, at a whole cost of about £9 10s. per day.

VALDEORROS ALLUVIAL GOLD MINES.

Although in 1900 there were 49 gold mines being worked in Spain, only two of them figured as "productive" propositions in the Government report. Their joint output amounted to 1,300 tons of ore, valued at £1,560. Both these properties were situated in the province of Coruna. Since that time a number of concessions have been acquired by English capitalists in the provinces of Leon, Orense, Lugo, and Galicia, the majority of which will, under capable management, yield very satisfactory returns. The first of these to be worked as an English company was the Valdeorros alluvial gold mine, 464 acres in extent, situated close to the town of Valdeorros, on the Northeastern Railway system, in the province of Orense. The concessions are held direct from the Spanish Government in perpetuity.

Practically the whole property is auriferous from surface to bed rock, the gold being found chiefly in coarse grains. The alluvial in some places attains a depth of from 18 to 25 feet, but the average depth is estimated to be about 10 feet. Trial samples taken from various parts of the area showed gold to be present in every case, and gave an average yield of gold equal to 6.83 pennyweights per ton of soil washed. The gold, which is of very fine quality and free from alloy, is valued at 27s. 3d. per ton of soil. In Australia, where the alluvial ground is worked by the hydraulic system on a large scale, the cost of treating the ore does not exceed 6d. per ton, despite the fact that all the water has to be pumped. The situation of the Valdeorros property on the river Sil dispenses with the necessity of pumping and yields all the water that may be required.

THE LUGO GOLD FIELDS.

* * * * *

There are several concessions on the main road to Madrid and 26 miles from Lugo, which consist of 525 acres of quartz country and alluvial property 75 acres in extent, which contain strong evidences that the Romans, during their occupation of the Peninsula, washed from it large quantities of alluvial gold. On the first group broad

gold-bearing quartz reefs, which increase in width from 6 to 24 feet as depth is reached, have been traced for many miles on each side of the property, and on the second group the reefs are highly mineralized and contain gold, silver, copper, and lead. The reefs are situated in hills rising from 350 to 450 feet above the river bed, which will enable the ore to be run out of the galleries by means of trucks on rails, and so save for some considerable time at least the initial outlay and annual expenditure entailed by the erection and maintenance of pumping and haulage machinery. In taking the samples of stone for assay good, bad, and indifferent stone was included, and the calculations as to the value of the ore was based on a minimum extraction of 5 pennyweights of gold per ton. The assays gave returns varying from 3 pennyweights 2 grains up to 15 pennyweights 8 grains, and the ore has been tested to be eminently adapted for concentration. Water, labor, and timber present no difficulties, and the working of the mines should be carried on at a low cost. It is estimated that the expense of mining the ore, delivering the concentrates in Swansea, and paying the charges for treatment there will amount to 10s. per ton of ore crude, which means that $2\frac{1}{2}$ pennyweights of pure ore will pay all expenses.

OTHER ALLUVIAL GOLD PROPERTIES.

Besides the foregoing, there are many rich alluvial properties in the provinces of Leon, Orense, and Lugo.

PORTUGAL.

Thus far this Bureau's interrogatories have elicited no definite information regarding the production and export and import of the precious metals in Portugal. The production, however, is slight, so small in fact, that it might almost be disregarded in a statement of the world's output. In the Report of the Production of 1897, basing the figures on the most reliable data obtainable, the gold production was placed at 17 kilograms, worth \$10,356, and the silver at 79 kilograms, of a coining value of \$3,037.

The following table contains a statement of the production of gold in Portugal since 1896:

GOLD.

Year.	Weight.	Value.
	<i>Kilograms.</i>	
1896	28	\$18,528
1897	17	10,356
1898	7	4,700
1899	1.7	1,121
1900	2.6	1,725

The figure for 1899 is quoted from Mines and Quarries for 1900.

No data whatever are at present obtainable regarding the production for 1901, and it will be noticed from the above that since 1896 the yield has rapidly diminished, with the exception of the year 1900, when there was a slight increase. It is believed, however, that the figures given represent the product of both the mines and the refineries. The gold production for 1901 is, therefore, placed at 2 kilograms, worth \$1,330 (approximately). The estimate of the silver yield of 1900, which was 3,790 fine ounces, of the commercial value of \$2,274, is repeated for 1901.

ITALY.

This Bureau has received no official statistics regarding the production of the precious metals in Italy during 1901, and therefore repeats

the estimates for 1900, which were as follows: Gold, 1,704 fine ounces, of the value of \$35,200; silver, 751,335 fine ounces, of the commercial value at 60 cents per ounce, of \$450,800, and of the United States coining value of \$971,400.

Italy's production for the last five years is exhibited in the subjoined table:

Year.	Gold.		Silver.		
	Ounces.	Value.	Ounces.	Coining value.	Commercial value.
1897.....	9,404	\$194,400	737,163	\$953,100	\$442,300
1898.....	8,027	165,900	804,512	1,040,200	474,700
1899.....	3,633	75,100	819,494	1,059,500	491,700
1900.....	1,704	35,200	751,335	971,400	465,800
1901.....	1,704	35,200	751,335	971,400	450,800

The gold veins on the sides of Monta Rosa, which were worked by the Romans, still continue to supply the precious metals, although the amount produced has rapidly decreased in recent years.

SWITZERLAND.

There are no gold or silver mines in Switzerland and no refineries yielding these metals.

GREECE.

Greece produces no gold, but a considerable amount of silver is derived from argentiferous lead.

The following table contains a statement of the silver obtained from this source since 1896:

Year.	Kilograms, fine.	Coining value.
1896.....	32,000	\$1,329,920
1897.....	37,431	1,555,632
1898.....	41,950	1,743,442
1899.....	36,659	1,523,548
1900.....	31,472	1,307,976
1901.....	35,902	1,492,086

In the absence of any data for 1901 the average of the five preceding years is taken to represent the production of that year. The figure for 1900 is quoted from the Statistique de l'Industrie Minérale for 1900. The commercial value of the product of 1901 would be \$692,421.

TURKEY.

This Bureau has received no official returns of the production of gold and silver in Turkey for 1901. A little alluvial gold is obtained in Thessaly and in some of the valleys of Macedonia, while deposits of silver lead at Edremid and near Adana are worked on a small scale. Turkey's production of the precious metals is comparatively insignificant.

PRODUCTION OF THE PRECIOUS METALS.

[From the report of the director of the French mint for 1901.]

Year.	Gold.		Silver.	
	Weight.	Value.	Weight.	Value.
	<i>Kilograms.</i>	<i>Francs.</i>	<i>Kilograms.</i>	<i>Francs.</i>
1893.....	13	44,240	7,165	740,167
1894.....	12	38,010	7,809	809,872
1895.....	8	26,595	10,208	884,415
1896.....	10.7	35,497	7,007	743,445
1897.....	21.9	73,457	7,110	516,254
1898.....	21	72,300	4,422	982,500
1899 ^a	21	72,300	4,422	982,500
1900 ^b	37	127,000	13,352	1,335,000

^a Figures for 1898 repeated.^b From the Statistique de l'Industrie Minérale, 1901.

In the absence of any figures for 1901 those of 1900 are repeated.

The value given for gold—127,000 francs—is equal to \$24,511, which represents 1,186 fine ounces; while the 13,352 kilograms of fine silver would be worth, commercially, approximately \$256,225, which would represent 429,180 fine ounces, equivalent to a United States coining value of \$554,909.

ASIA.

CHINA.

China prepares no official statistics of her production of gold. This Bureau, therefore, is compelled, following the method adopted in former years, to determine the amount by reference to her declared exports.

China's silver production is so slight as to be a negligible quantity in the summary of the world's production.

Through the courtesy of Mr. A. Sauerbeck, this Bureau is annually furnished with statements of the imports of gold from China into the United Kingdom and into Germany in advance of their official publication.

The amount of gold bullion exported from China into Germany in 1901 was 7,282 fine kilograms, valued at 20,317,000 marks, which is equivalent to \$4,839,606, or 234,116 ounces.

The Chinese exports of gold into the United Kingdom in 1901 amounted to 69,523 ounces, valued at £266,062, which is equivalent to \$1,294,780. From the value given it is evident the quantity is not expressed in fine ounces; it would represent 62,635 fine ounces.

According to a statement of the imports of gold bullion in 1901 from China into India, published by the government of the latter country, the amount was approximately \$2,049,138, or 99,127 ounces. The fiscal and calendar years not coinciding, the calculation by which this result is obtained is based upon the assumption that the monthly average imports remained constant throughout each of the two calendar years—those for 1900 and 1901 ranging about 20 per cent higher than those of 1901 and 1902.

From the report of the director of the imperial mint of Osaka, it is learned that Japan imported, in 1901, Chinese gold ingots to the amount of 362,009.85 mommes fine, equivalent to 43,924 Troy ounces, worth \$907,990.

Assuming, therefore, that China's gold production in 1901 was equal to her exports to these four countries which doubtless receive nearly if not all her yield, she produced in that year 439,802 fine ounces of gold of the value of \$9,091,514.

Following is a tabular statement of these exports:

Country.	Fine ounces.	Value.
United Kingdom	62,635	\$1,294,780
Germany	234,116	4,839,606
India	99,127	2,049,138
Japan.....	43,924	907,990
Total.....	439,802	9,091,514

This Bureau's estimate of China's gold production in 1900 was \$5,574,400. There was consequently an increase in 1901 of \$3,039,036, or over 54 per cent.

MINING IN CHINA.

[From Consular Reports, April 18, 1902.]

GOLD.

Gold placers have been worked on the Yalu and its tributaries for ages, and many placer claims are still producing well, although operated in the crudest way. Sluice boxes are only 6 feet long and are without riffles or any arrangements for saving the fine gold; only the coarse is collected.

There are many evidences of quartz prospects, and it is believed that this section will soon be one of the great mining districts. Ledges worked by the natives indicate considerable value; but as they know absolutely nothing of how to work quartz mines, and have no tools—not even a hand drill—very little can yet be determined.

The expense of reaching the country and the introduction of mining machinery would not be great. The cost of labor and fuel would be as cheap as anywhere in the world.

The usual cost of living is only \$2 Mexican (about \$1 gold) per month.

GOLD MINES NEAR PORT ARTHUR.

The report of M. C. Bogdanovitch, a government mining engineer, who has spent three years in examining the coast of the Okhotsk Sea—especially in the southern part of the peninsula of Liao-Tung—has just been published in the twentieth volume of the Elements to the Geology of Russia. Mr. Bogdanovitch found gold in the mass of rock at Liao-Te-Chan, in the vicinity of Port Arthur, near the Bay of Siao-Pin-Dao, near the lake of Hon-Tsa-Pao-Tis, near the temple of Tcheou-Tsia-Town, in the basin of Lema-San-He, and a gold mine with veins near the village of Tundsia-Pei-Ho, as well as other mines of less importance. He is of the opinion that there are veins of gold in the sides of Golden Mountains, near Port Arthur, but has formed no definite opinion as to the existence of gold near the Bay of Siao-Pin-Dao. The mines near Lake Hon-Tsa-Pao-Tsi seem to be poor.

Between the temple of Tonhon-Din-Miao and the village of Tian-Tsi-Town Mr. Bogdanovitch found that gold sands had been worked in a primitive way by the natives and the washing of 500 poods (18,056 pounds) of sand in his presence yielded 1 zolotnik (0.11 ounce) of gold per 100 poods (3,611 pounds) of sand. The analysis of the samples proved that the nuggets contained 952 parts of gold and 36 of silver; the nuggets found in the region of Lema-San-He contained a smaller quantity of fine ore.

Mr. Bogdanovitch thinks that the veins near the village of Tundsia-Town-Pei-Ho should receive a more thorough investigation. The chemical analysis made in the laboratory of the minister of finance at St. Petersburg of various samples of ore from this mine shows a yield of 1 zolotnik 29 dolias (0.111 ounce) of fine gold per each 100 poods (3,611 pounds) of ore, which is sufficient to make the working of this mine very profitable; but additional reports are expected.

Among the rivers that cross the eastern watershed of Liao-Te-Chan the most important is the Po-Tsian-Tsi, but the gold district found along this river does not seem to be sufficiently rich to pay for working. Between the mouth of the river and the temple of Tchih-Tchei-Tsi nuggets have been found weighing 12 zolotniks 75 dolias (1.321 ounces).

These nuggets, the engineer thinks, are due to the continuous action of the sea water on the rock, and the working of these mines presents no technical difficulties, though the coast is open and for that reason exposed to the action of the waves.

[From the Mining and Scientific Press, July 19, 1902.]

From Niu Chwang Consul H. B. Miller writes that there are no quartz mines in operation in Manchuria excepting those operated by the Chinese with their own methods, which consist in roasting the ore, grinding, and then washing it. This is carried on in a very rude way with both silver and gold; but all the appliances are so crude as to indicate little as to the value of the mines. Nothing has been done excepting incidental prospecting. Mining in the immediate vicinity of Port Arthur can only be carried on by permission of the Russian Government.

All of Manchuria from Port Arthur north to Siberia is mineralized; gold, silver, copper, iron, asbestos, anthracite and bituminous coal have been discovered and worked by the natives.

Gold placers have been worked for ages on the waters of the Yalu and Sungari rivers, and are still operated in very crude ways, without pipes, giants, or water pressure.

Gold and silver quartz have been hammered out and roasted in mines in these sections for forty years or more, but no reliable prospecting has yet been done, and foreign mining experts have never given the country even casual investigation.

Consul Miller says he has met and interviewed several Chinese who are operating mines on the headwaters of the Yalu who tell him that many quartz ledges carrying gold have been discovered and worked in a crude way, without the use of drills and powder, and that from the richest they secured \$250 to the ton.

The Chinese Government has recently issued a new set of mining regulations that will have a tendency to retard rather than increase mining in China.

[From Annales des Mines, November, 1901.]

Gold mines are extremely numerous in China. The fields mentioned in native statistics extend toward the south as far as Laos. The natives have scarcely touched the quartz veins. The only mine at present being worked is that of Ta-Lau near Se Mao. From information gathered there is no doubt that there are valuable gold deposits along the eastern border of Thibet and Burma. This opinion is confirmed by the nature of the ground on the declivity of Ta-Li where the Blue River takes the name of Kin-cha-kiang. This conglomerate is very extensive, sometimes reaching a depth of 100 meters. There are about 500 men working along the course of the river. During the dry season they work the sediment which comes from the cliffs, and during the rainy season they work higher up. By these rude processes they obtain from one to two centigrams of gold a day.

CHINESE RULES AND REGULATIONS FOR MINING.

Under date of April 4, 1902, Minister E. H. Conger, of Peking, sends a copy of the new rules and regulations for mining sanctioned by the Chinese Government, as given below:

(1) All persons intending to engage in mining, whether with native shareholders or by borrowing foreign capital, must first of all clearly petition the foreign office and present the petition in person, or request the viceroy or governor of their respective provinces to forward their application to this board, and await an official reply. Whenever permission to mine is given, a certificate will be granted, without which no mining operations can be undertaken.

(2) When such applications are approved by the foreign office, that office will refer the application to the bureau of mines and railways for approval. On receiving from the head office a reply in the affirmative, the foreign office will advise the bureau of mines and railways to issue a permit, after receipt of which mining operations may be commenced. Fees for such permits will be charged at the rate of 1 per cent on the capital, which must be paid to that bureau for office expenses.

(3) The applicant who originally applies for a permit for mining must himself carry on the matter; he can not sell it to some one else. [It is not transferable.] In case he desires to sell out before or after he has begun operation, the original applicant must, with the transferee, apply again to the foreign office, according to articles 1 and 2, and put the matter on record. When this has been complied with, then the transfer can be made.

(4) If the owner of the land can not come to terms with the mining parties, the original petitioner should first parley with him, agree on a price, and have it recorded. It should not be a private (or secret) transaction. If, for Government reasons, the land should be mined and the owner of the land is obstreperous, he should be made to yield to the wishes of the Government. In such a case, the officials shall pay the owner a reasonable price, so that mining can be begun at will.

(5) Applicants for concessions may be Chinese or foreigners, or Chinese and foreigners in partnership; it makes no difference. But the land being Chinese soil, and permission to mine being granted by the Chinese Government, it behooves all who undertake mining operations to respect and abide by the rules and regulations of this Government. If trouble of any kind arises, the Chinese Government can use its sovereignty to make a settlement.

(6) According to the valuation of the vein opened, a tax must be paid as follows:

On 100 taels' (\$68) worth of coal, iron, antimony, alum, borax, etc., 5 taels (\$3.40), or 5 per cent.

On kerosene, copper, lead, tin, sulphur, cinnabar, etc., 10 per cent.

On gold, silver, spelter, quicksilver, etc., 15 per cent.

On diamonds, crystals, etc., 25 per cent.

Ores which are not included in the above list shall pay a tax according to the nearest mineral mentioned.

There is still to be an export duty at the treaty ports, but no likin. The above amount is to form a distinct revenue, for which the customs are to open a separate account.

(7) Every company receiving a permit must begin work within twelve months. After that limit the permit will be canceled and a new concession given. The fact will be advertised in all the foreign and native papers.

(8) A railway for transport may be built from the mines to the nearest port or to the nearest trunk line.

(9) A mining school shall be started near to the mine, the expense to be borne by the company.

(10) All materials and mining machinery from abroad shall pay an import duty only at the port; there shall be no likin. Whatever material is procured inland shall be given a free transit pass if it is found to be really for use at the mines. But smuggling of any kind will be heavily fined.

(11) The company must report to the foreign office when mining engineers are engaged, so that word can be sent to the viceroys and governors to instruct the local authorities to give them adequate protection. In case of trouble, the local authorities will be held responsible. In disturbances caused through the purchase of land, opening a mine, or by the workmen, the local officials must issue a proclamation and restore order. If any malpractice is discovered, they will surely be impeached and no leniency will be shown.

(12) Mining land belonging to the people may be purchased at the market value, but Government land must be leased. The new owner shall pay a land tax, as is customary. Only land needed for sinking shafts or other mining purposes shall be occupied.

(13) In buying land, the company must pay a fair price and not appropriate the land by force; nor must the owners raise their price to excess. Putting obstructions in the way on account of "feng-shui," etc., will not be allowed. In case the owner prefers to take shares rather than money for his land, this may be done.

(14) Houses and graves are to be avoided. But if the land to be mined has houses or graves on it, the original owner shall be well compensated and a removal effected.

(15) There should be Chinese police to guard the mines, the expenses to be met by the company. Foreigners should have charge of the machinery and accounts, but all other employees should, as far as possible, be Chinese, and should be well paid. In case of accident to the workmen in the mines, their families should be compensated.

(16) Chinese who have studied mining abroad, or who are merchants abroad and wish to invest in mines in China, may report to the foreign office. Students who are successful in prospecting will be recommended for imperial honors.

(17) Those investing money in mining will be protected, but the Government will not be responsible for losses, nor for money borrowed from foreigners. Let the mer-

chant borrow from some other merchant to repay the foreigners. It is no concern of the Government.

(18) Accounts must be made up each year, and of the net gain 25 per cent shall be paid as royalty to the Chinese Government.

(19) All companies having already received concessions or begun work may follow their regulations, except in article 6 of the present rules. New companies must adhere to these rules.

KOREA.

In this Bureau's report of the production of the precious metals during 1897 Korea was credited with 1,103 kilograms fine of gold (this being the declared amount of the exports), worth \$733,031; and it was stated that the actual yield, in view of the fact that large amounts are annually exported clandestinely, was supposed to be considerably larger.

In the absence of other data, the country's yield was, in the report for 1898, placed at the same figure, i. e., \$733,031.

Regarding the production of 1899, Mr. Allen, United States minister at Seoul, stated that the declared exports from Korean ports during that year amounted to 2,933,232 yen, or \$1,464,419, and that the lowest conservative estimate gives an equal amount for the undeclared export which would make the export of gold in 1899 amount, approximately, to \$3,000,000. In addition to this, it is stated that the industrial consumption and private hoarding was considerable. The annual production of gold in Korea for that year may therefore be placed at from \$4,000,000 to \$5,000,000. From the same source it is learned that the declared exports in 1900 were 3,633,050 yen, or \$1,816,525, the minister stating that the actual product of the country was between \$4,000,000 and \$5,000,000.

Mr. Gordon Paddock, chargé d'affaires at Seoul, states, under date of March 28, 1902, that "gold to the value of 4,857,201 yen was exported to Japan and 136,150 yen to China in 1901, chiefly in the form of bullion," a total declared export of 4,993,351 yen. He further states:

Owing to the absence of statistics, the amount of gold produced in Korea is unknown, but for the year 1901 it might be conservatively estimated at between \$5,500,000 and \$6,000,000, the declared exports amounting to 4,993,351 yen, against 3,633,050 in 1900.

The statement that an almost equal amount is believed to have been exported clandestinely, and that there is considerable gold used in the arts, etc., is repeated.

The following table, taken from the Board of Trade Journal, London, May 1, 1902, contains a statement of the gold exports of Korea for the last five years:

1897.....	£205, 527
1898.....	240, 047
1899.....	293, 338
1900.....	363, 305
1901.....	509, 738
Total.....	1, 611, 955

The annexed table contains a statement of Korea's declared exports of gold from 1897, in United States money, with the equivalent weights, together with this Bureau's revised estimate of the actual production of the country. The statement made from year to year that the

declared exports represented only about one-half of the country's yield seems to require correction, and while the clandestine exports doubtless are still very considerable, it is not likely that with the greatly increased production in well-developed mining centers they still constitute 50 per cent of the whole.

Year.	Declared exports.	Estimated actual production.	Approximate number of ounces.
1897.....	\$997,889	\$1,020,200	49,350
1898.....	1,168,189	1,168,200	56,511
1899.....	1,427,529	1,459,000	70,579
1900.....	1,768,024	4,500,000	217,687
1901.....	2,480,640	4,500,000	217,687

SIAM.

While it is stated that alluvial gold exists in Siam, especially near Lophburi, and that reef mining has been carried on at Kobin and Watana, the answer to this Bureau's interrogatories for 1901 stated that no gold-mining operations were carried on in Siam during that year. The yield in any case must be so slight as to be a negligible quantity in the statement of the world's production.

BRITISH INDIA.

According to figures furnished this Bureau, through the United States consulate at Calcutta, by Mr. J. E. O'Connor, director-general of statistics to the government of India, that country, in 1901, produced 16,538 kilograms of standard gold, valued at £1,930,737, equivalent (rating the pound sterling at \$4.8665), to \$9,395,932 in United States money, which would represent 14,138 kilograms, or 454,528 ounces of fine gold. Although this gold is stated to be standard (the British standard is 0.916 $\frac{2}{3}$), the figures indicate that the gross amount of gold reported, i. e., 16,538 kilograms, was only about 0.855 fine.

The following table shows the gold production of British India from 1892:

Year.	Weight (0.916 $\frac{2}{3}$ fine).	Fine weight.		Value.
	Kilograms.	Kilograms.	Ounces.	
1892.....	4,993	4,576.916	147,150	\$3,041,818
1893.....	6,262	5,740.166	184,541	3,814,914
1894.....	6,371	5,840.083	187,756	3,881,319
1895.....	7,643	7,006.083	225,243	4,656,243
1896.....	10,063	9,224.416	296,552	6,130,547
1897.....	11,896	10,904.666	350,596	7,247,241
1898.....	12,773	11,708.583	376,412	7,781,524
1899.....	14,213	13,028.583	418,850	8,658,796
1900.....	15,488	14,197.333	456,435	9,435,548
1901 <i>a</i>	16,538	14,138.000	454,528	9,395,932

a Believed to be 0.855 and not 0.916 $\frac{2}{3}$ fine.

While most of the gold produced by India is mined in Mysore, the metal is found in many of the small streams of Jahore, which have no names. Mr. Snow reports that he has found gold by panning. On Sungeis Tenoh, Ayer Terap, and Anak Kadona there are very extensive old workings also that should pay well.

GOLD.

[From Consular Reports, December 10, 1901.]

Gold is produced mostly in the mines in Mysore, where the annual output now exceeds 500,000 ounces. From the mines in the Nizam's territory only a small quantity has been extracted as yet. No account is taken of the gold produced in parts of northern India from the washings of river sands; there are no means of stating the quantity statistically, but it is well known that it is entirely insignificant.

The aggregate reported production is 513,266 ounces, the value of which may be taken to represent about \$10,000,000.

JAPAN.

In the absence of recent official statistics of the production of gold and silver in Japan, this Bureau quotes the following from the *Journal des Economistes* of May 15, 1902, for the yield of 1898:

Gold, 1,161 kilograms; silver, 60,549 kilograms. Neither the fineness nor the value being given, the latter is estimated by the value of the product of the two succeeding years, and following results are obtained: Gold, \$655,000; silver, \$1,101,386.

According to Mines and Quarries the figures for 1899 are as follows: Gold, 1,673 kilograms, valued at \$943,746; silver, 56,168 kilograms, valued at \$1,021,654; and for 1900: Gold, 2,130 kilograms, worth—basing the estimate on the assumption that its fineness was the same as that of the preceding year's product—\$1,201,548; silver, 58,953 kilograms, of an estimated value of \$1,072,355.

There are at present no figures obtainable for the production of gold and silver in Japan for 1901. Those for 1900 are, therefore, repeated.

The following table gives a statement of the production for the last three years, for which statistics are at hand:

Year.	Gold.		Silver.	
	<i>Kilograms.^a</i>		<i>Kilograms.^a</i>	
1898	1,161	\$655,000	60,549	\$1,101,386
1899	1,673	943,746	56,168	1,021,654
1900	2,130	1,201,548	58,953	1,072,355
1901	2,130	1,201,548	58,953	1,037,762

^a Crude.

The values given above for 1901 would indicate a fine contents of 58,127 ounces and 1,729,603 ounces for gold and silver, respectively.

JAPANESE MINERAL PRODUCTS.

[From Consular Reports, March 24, 1902.]

It is not generally known that Japan is rich in any minerals except copper, coal, and iron; yet she has furnished a considerable proportion of the world's supply of the precious metals. The following table shows the output of the mines of the country for 1900 (the latest data obtainable), as reported by the mining inspection boards to the department of agriculture and commerce. The values given are computed by the average quotations in the Osaka market.

Description.	Quantity.	Value.
Gold.....tons..	2.3369	\$1,410,390
Silver.....do...	6.4686	1,163,606

GOLD.

The amount of gold seems small in comparison with the output of what are known as the gold-producing countries, and yet Japan was one of the countries whose fabulous wealth aroused the cupidity of Western nations in the time of Columbus, and Mr. Wataru Watanabe, a Japanese mining engineer, is authority for the statement that during more than 160 years previous to 1776 Japan annually exported 1,600 pounds avoirdupois of gold and an equal value of silver. The country is now producing one and one-third times as much as the exports of the period referred to, although the mines, with one exception, are still worked by the wasteful system of a century ago; and Mr. Watanabe thinks that by employing proper methods there should be no difficulty in placing Japan among the gold-producing countries. He says:

"Gold veins are very well distributed throughout the country, from Hokkaido in the north to the farthest end of Kiushu in the south. Comparing the areas of other gold-producing countries with that of Japan and computing the amount of the subterranean treasure from the respective areas, this country must be called an excellent gold field."

Some new mines, recently discovered in Kiushu, are said to be very extensive.

JAPAN.

[From Mines and Quarries, 1902.]

There are also alluvial deposits of gold on the island of Hokkaido. Gold likewise exists in Formosa, the mines situated in the neighborhood of Kelung being the most productive.

EAST INDIES.

BRITISH EAST INDIES.

According to the Report (preliminary) of the Department of Mines of Western Australia for 1901, New Guinea, during the fiscal year ending June 30, 1901, produced 9,188 ounces of gold, valued at £32,646, equivalent to \$158,872, or 7,685 fine ounces, which is assumed to have been the product for the calendar year. This is slightly less than the product for 1900. Many parts of New Guinea are gold bearing; nearly all the deposits are alluvial.

Mines and Quarries for 1900 states that in Sarawak gold is extracted from quartz, the mills at Ban and Bidi crushing about 15,000 tons a month. All gold is extracted by the cyanide process, and the product of 1900 is placed at 22,000 ounces, which in the absence of later data is assumed also to have been the yield for 1901.

In the Federated Malay States the most important mining centers are in the province of Pehang, where quartz veins are worked. The Raub Concession is by far the most important, it having yielded since 1897 annually 12,000 ounces.

Assuming the product of Sarawak and of the Federated Malay States to have been fine, the gold product of the British East Indies for 1901 is estimated to have been worth \$861,714, equivalent to 41,685 fine ounces.

DUTCH EAST INDIES.

In the Dutch East Indies the chief gold workings are in Borneo, where there are three well-marked auriferous districts, viz. Sambas, in western Borneo; a second at the sources of the Kehajang and Kapuas rivers, in central Borneo, and a third in the southeastern corner of the island, which annually produces approximately 200 kilograms.

In Sumatra the principal gold workings are at Redjang Lebong, in the southwestern part of the island, where about 200 ounces of gold are produced annually.

In Java the natives, especially the women, wash the river sands in wooden bowls and secure considerable gold.

In last year's report this Bureau placed the gold product of the Dutch East Indies at \$435,000, basing the estimate on data furnished by the United States minister at The Hague, and in the absence of any information for 1901 the product for that year is placed at the same figure.

THE MINING AND OCCURRENCE OF GOLD IN THE DUTCH EAST INDIES.

By S. J. TRUSCOTT. Abstract of paper read before the Institution of Mining and Metallurgy, London.

[From The Engineering and Mining Journal, New York, October 4, 1902.]

* * * * *

In Sumatra the Dutch Government itself had in the very early days worked upon an occurrence of gold-bearing mineral ore; in west Borneo the occurrence of alluvial gold had been amply demonstrated by the amount of work done and by the gold obtained by the Chinese, with whom the Government were in prolonged conflict, and in Celebes the native workings in the northern peninsula were established as a fact again and again.

In all these indications there was sufficient to justify the further exploration of the reputable places. The quest was taken up eagerly, so that within the last five years from 80 to 100 companies have been formed and about \$2,500,000 has been spent upon exploration work alone, in addition to that which has been spent upon the actual exploitation of those mines which have reached that stage.

SUMATRA.

The gold mining in this island now centers around the mine Redjang Lebong, which is in the southwest part of the island, about five days' traveling by bullock wagon from the town of Bencoelen, on the west coast. From this town a road having a total length of about 100 miles leads to the mine. More than one-half of this road was made years ago by the Government, and the remainder has been made by the company. The highest point along it is 3,100 feet above the sea, and the altitude of the mine is about 1,300 feet. Transport is difficult and expensive, and during the wet season, which lasts about four months, it is almost impracticable.

The discovery of old mining works by Europeans was first made in the year 1896, and this was quickly followed by proper development, so that very early in the year 1898 the ore body exposed had been well surveyed and a trial crushing had been made. The reef was then given a known extent of 1,000 feet in width, and its value by assay was 2 ounces of gold and from 7 to 10 ounces silver per ton.

The occurrence of the ore is very curious. The outcrop is seen lying uncovered for a height of over 100 feet upon the steep face of a hill, at an angle of about 50°. This hill, which forms the foot wall, is of porphyrite or altered andesite. Below the surface the reef is steeper, dipping about 70°, so that it would appear as if it had inclined over on the surface consequent upon the decomposition of the foot wall; the hanging wall on the hillside has either been completely eroded away or cleared away by the natives centuries ago, so that they might prosecute their mining work upon the reef. It was noted in the last annual report of this mine that the value of the reef increases from the most exposed part to that which is better protected, as though the upper parts had suffered in value by reason of their exposure.

The ore is generally a hard, close-grained amorphous silica, with very little quartz proper. With it there are occurrences in places of a breccia of black silicified slate, and more generally it is accompanied by an amount of colespar. The gold occurs so finely disseminated throughout the mass that it is rarely visible even with the help of a microscope. This gold appears to exist in two forms, one as free gold, found principally in the richer seams, and the other as auriferous silver, carrying gold in the proportion of 1 of gold to 10 of silver. It will probably be found that in depth this silver exists as sulphide connected with pyrites. It has been suggested that the gold may ultimately be found to exist in connection with tellurium, but an analysis made by Johnson, Mathey & Co. of bullion from the mine is remarkable for the amount of selenium, and gives no evidence of the occurrence of tellurium.

About 5 miles due west from Redjang Lebong there is another and very similar gold-bearing reef at a mine called Lebong Soelit. At this place there are four outcrops of reef which have been worked by the natives, and which are in such relative positions to one another that one faulted reef, of which these outcrops are parts, is suggested. The total length of reef so indicated is about 2,000 feet, over which the average width is not less than 8 feet and the average value about 1 ounce. The ore has all the appearance and characteristics of that from Redjang Lebong.

The communication of this mine, Lebong Soelit, with the coast is by means of a light tramway about 28 miles long to a river which is navigable from that point to the coast by steam launch and lighters.

This means of communication will probably be eventually used for Redjang Lebong, and it will then be the trunk way for the district, as it would be also in position to serve a third discovery of similar ore which lies about 7 miles due west and in a straight line from Lebong Soelit.

These three occurrences of gold-bearing ore at Redjang Lebong, at Lebong Soelit, and at a third unnamed place lie practically in an east and west line, which, to embrace all three of them, is about 12 miles in length. This similarity in general position is rendered more noticeable by a similarity in detail. All the three reefs extend in length along the line which joins the three places as though they were portions of one and the same reef, which, however, is most improbable, as it has never been suggested. These three mines form together a district of great prospective value.

Farther to the north toward the center of the island there are other areas around Fort de Kock and Soepajang which have also been prospected during recent years, but no reef of any value has so far been discovered in that neighborhood. The country rock to which the gold has been followed consists of porphyrites and slates, but the quartz veins found in them contain only traces of gold. Some of these veins are very large, so that possibly they are altered zones of the country rock, or possibly they are dikes and not veins or reefs in the simple senses of those words. In some cases the small pits which have been sunk in the river beds by the natives for auriferous alluvial wash can be followed right up to these reefs or zones, but are not seen upstream beyond them, showing plainly that in those particular cases they are the sources of the gold for which the natives worked.

BORNEO.

In this island there are three principal auriferous districts, one in west Borneo, centered around Samhas; another in central Borneo, at the sources of the Kehajang and Kapuas rivers, and the third in the southeastern corner of the island. These districts are situated in a wide stretch of country which crosses the island from northwest to southeast and outside of which not much gold has been found.

In west Borneo a very large amount of work has been done in the neighborhood of Samhas and in the direction of Sarawak upon alluvial and detrital deposits by the Chinese, so that exploration work was here undertaken with a lively hope of finding payable ore deposits. In this there has been, so far, considerable disappointment, the result of the work being to show that the best statement about the occurrences of gold in parent rock is that it is found in veins or vein-like impregnation in the old slates and eruptive rocks. The old slates are generally considered to be Devonian, but with them there are some sandstones and conglomerates which resemble in some respects the beds of the first stage of the Eocene period. The eruptive rocks are varieties of granite and porphyrite; the valleys have been worn in these places where these rocks were much decomposed, leaving the hills occupied by the harder and more holo-crystalline varieties. The old slates are broken and traversed by dikes of the eruptive rock, upon the masses of which they also lie, showing that they were in position before the intrusion of the eruptive rocks beneath them. In addition, both formations are traversed by dikes of a much more recent date, and in the district there are some massive occurrences of this later igneous rock, though these do not occur in the immediate neighborhood of the areas which have been more actively prospected lately.

In the igneous rock the occurrence of gold appears to be limited to the traverse of the veins or dikes or to the contact with the slate formation; similarly, the occurrence in the slate is generally near the igneous rock. There are no large, regular quartz veins; those which are found generally give out after they are followed for a short length, although in the center of their extent they may have appeared very promising, both in appearance and value. This has been the case both on the Loe-mar concession, in eruptive rock, and in the Benkajang concession, in the old slates.

In addition to the veins there are vein-like impregnations which probably follow lines of fracture or contact. These occur both in the slate and in the eruptive rock

as zones which have auriferous pyrites disseminated with small quartz veins throughout their extent. It is probable that the greater part of the alluvial gold that has been obtained was originally derived from these zones of impregnation.

It may be mentioned that the greater portion of the alluvial deposits are upon a bed rock of decomposed eruptive rock, and that there are occurrences which would almost indicate that there are local zones where an impregnation with gold would appear to have been a primary condition of the igneous rock; and, indeed, it may generally be said of this district that the presence of eruptive rock upon the ground is more necessary to the occurrence of gold than the presence of the old slates.

The surface deposits upon the hill slopes have yielded a good deal of alluvial gold, most of which is not waterworn, so that it can not have traveled far. Yet the exploration for gold reefs in this part of Borneo by Europeans has not resulted in any definite success.

In addition to ordinary iron pyrites, various other sulphides, such as chalcopyrite, galena, or zinc blendes have been found in connection with gold ore, and in Sarawak there was a special occurrence of the sulphide of antimony with gold in it.

There are large areas of alluvial ground where the value of the deposits is rich when compared with the general average of such deposits in other countries where such mining has been carried on successfully, and it may be that these deposits will provide profitable exploitation. In such areas there is usually a great deal of water, so that the work will have to be done by dredges, and this, together with the difficulties of transport, communication, and of climate, will make any such exploitation a difficult undertaking.

The central Borneo auriferous district is found around the sources of the rivers Kehajang and Kapuas, which flow south into the Java Sea.

The present interest there is centered around the Kehajang mine, which is situated about 7 miles from the right bank in the upper part of that river. Communication is by steam launch for about 200 miles upstream from the sea, and then by boats for the remaining distance, which is not great.

The occurrence at this mine is that of gold-bearing quartz veins in a rock locally known as granite, at the contact of the granite with an old slate formation. It is more than probable that the granite upheaved the slate and that alone, and near the junction between the two fractures were formed which were filled with auriferous quartz. At the junction both rocks bear evidence of having been fractured and afterwards altered by deposition of silica and iron pyrites, and a good deal of the quartz in the reefs would appear to be a replacement of the original granite by silica; for much of it is friable, as though the silification had not been complete enough to produce a solid and compact mass. The deposition of pyrites was also marked, especially in the slates, which were traversed in places by small quartz veins accompanied by galena, pyrites, and zinc blende, these sulphides being also impregnated in the rock. In one place, quite close to the granite, such an amount of silica had also been introduced into the slates that a solid mass was formed, inside of which the pyrites and other sulphides were entirely protected from oxidation, so that these slates on surface retained their dark, unoxidized color.

In the Kehajang mine two reefs are being worked which run parallel in a north and south direction and at a distance of 212 feet from one another. The rock between them, though principally crystalline rock, has some schistose bands within it, which have probably been caused by pressure upon those of its parts which contained but little quartz. Between the two reefs other bands of quartz occur, but they are poor and do not contain more gold than the whole extent of rock, which from one reef to the other contains an appreciable though very small amount.

The more easterly of the two reefs is quite close to the junction of the granite with the slate. It is about $3\frac{1}{2}$ feet wide and its average assay value is about 1 ounce of gold per ton and 12 ounces of silver. It has been followed for some hundreds of feet, and at its northern end it is entirely on the eruptive rock. The greater part of the gold which it carries is coarse and free, and the sulphurets vary from one-half per cent near the surface to $4\frac{1}{2}$ per cent underground. These sulphurets assay about $1\frac{1}{2}$ ounces of gold per ton, and they consist chiefly of iron pyrites with a little copper pyrites. It is in the slate country that sulphides of lead and zinc are more noticeable.

The second reef is well within the granite country. It is 1 foot more in width, and, though its extent has not been proved for any great length, yet it has a very high assay value, probably averaging over 5 ounces per ton. The percentage of sulphurets in it is higher than that of the other reef, though the value of them when the free gold has been taken out remains much the same.

In the neighborhood of this mine there are two other occurrences of gold which are worthy of note. One is that of detrital gold upon a granite country rock and the other is that of a quartz reef in a slate country. The first is about $1\frac{1}{2}$ miles away, at a place where, the slate having been crossed, the granite occurs again. Here

there are many old native pits sunk down to the top of the granite, which is weathering in situ. These pits are almost confined to the granite, as but few of them are found on the slate country, which is close by. The granite is quite similar to that occurring at the Kehajang mine. Being really a quartz porphyrite, it consists almost entirely of quartz and a felsitic mass, but the quartz is not rounded.

The second occurrence is that of a quartz reef about 8 feet wide and assaying about one-half ounce of gold per ton. It is in a slate country, but it is anticipated that this rock will soon give place to the granite, which is close by.

In a southerly direction and about 5 or 6 miles away in a straight line there is a formation very similar to that at the Kehajang mine.

It consists of gold-bearing quartz veins near the junction of slates and granite. The slates are black and yellow, and they lie upon the granite, which has, in places, a pisolitic structure. This prospect has not yet been further opened up, but its good value has been recognized.

There is a wide distribution of alluvial gold in the district, and in every case it can be traced to have its origin in an igneous rock which is very variable in its character, but which is generally either a felsite or a porphyrite, and which sometimes is found as dikes and at other times as masses.

As igneous rock, with its impregnated dikes and zones, is much developed in this district, the river beds contain the gold which has been loosened as the rock disintegrated, and for this gold the natives have worked for many years. During the dry season the lowest portions of every sandy spur are the scenes of native gold washing, and their results make it likely that to work with dredges would be profitable, the only drawback being the number of snags in the river bed.

It was the report of these alluvial washings which first drew the attention of Europeans, and though it is practically certain that the greater part of the gold so occurring results from the impregnation of gold in a parent rock in such minute quantities that it could never be payable, yet gold richly concentrated in the form of quartz veins has been found, and the prospect of finding similar veins is good. It is anticipated that when this district is opened up it will be a regular gold-producing country, though at present it is in such an out of the way place that it can not be developed with any speed.

In the southeastern portion of the island of Borneo there are occurrences of alluvial gold of small extent, and there are evidences that this gold has its source in extended occurrences of an easily decomposed igneous rock, which appears on surface in a soft, weathered state, and which is probably porphyritic or altered andesite.

A GOLD DEPOSIT IN THE PHILIPPINES.

[A. M. HOWE in the Engineering and Mining Journal, November 30, 1901.]

On the island of Mindanao, Surigao Province, about 400 miles southeast of Manila, there is a peculiar gold placer deposit. A mountain 10 miles west of the port of Surigao gives pan prospects on all sides from the foot of the hill to the top. The gold in place seems to be in small calcite stringers in serpentine. The extensive disintegration of the serpentine has liberated the gold, which is found in crystalline form. A shale bed rock has been exposed in some places in workings in the ravines. About 15 Americans, mostly ex-soldiers, were working on the mountain, but none were making wages. The Filipinos, men and women, have worked the deposit for years, and, according to the local authorities, have taken out much gold. The Filipinos work the gulches and hillsides and also drift in under the deposits, following good streaks. They use their hands and a stick for digging, and carry out the earth in cocoanut shells and baskets to water, where it is panned in a wooden batea, in the use of which they are very expert.

Most of the Philippines are virgin ground, never explored by the prospector.

No white man has ever been in the interior of Mindanao. The Spaniards did not venture far from the coast, on account of the Moros.

Many of the streams and ocean beaches give gold prospects. The best the writer saw was about 7 cents to the pan.

Until Congress passes a mining and a land law for the Philippines, but little can be done in developing the islands. Land courts should be established to clear up old titles. Mining titles will be easy to clear, as the little mining done by Europeans has all been done under the Philippine mining law of 1846. The titles to agricultural land are in very bad shape on account of many verbal transfers and no records. There is no producing gold quartz mine in the Philippines, but it is certain that there will be later on. The writer saw one vein that assays over \$40 in gold.

AUSTRALASIA.

AUSTRALIA.

GOLD.

According to the annual report of the secretary for mines and water supply of Victoria for 1901, Australasia during that year produced 4,295,425 crude ounces of gold of the average fineness of 0.865, equivalent to 3,719,080 fine ounces, valued at £15,797,845, or \$76,880,206 in United States money. The yield for 1901 exceeded that of 1900 by 163,580 fine ounces, or \$3,381,498, an increase of 4.38 per cent.

These figures vary but slightly from those given in the preliminary report of the department of mines of Western Australia, which places the total product at 3,719,103 fine ounces.

The appended table, which is taken from the report of Victoria, gives the product by colonies:

Colony.	Crude ounces.	Value in pounds sterling.	Commercial value in United States money.	Fine ounces.	Average fineness.
Western Australia.....	1,841,498	£7,089,767	\$34,502,780	1,669,072	0.906
Queensland.....	835,553	2,541,892	12,369,654	598,382	.716
Victoria.....	789,562	3,102,753	15,099,804	730,453	.925
New South Wales.....	267,061	921,282	4,483,473	216,888	.812
Tasmania.....	78,700	295,176	1,436,506	69,491	.884
South Australia.....	27,490	93,192	453,519	21,939	.761
New Zealand.....	455,561	1,753,783	8,534,470	412,855	.906
Total.....	4,295,425	15,797,845	76,880,206	3,719,080	.865

In the following table the official figures for 1897, 1898, 1899, and 1900 are reproduced from last year's report, where the sources of information are given in detail. The last column is taken from the preceding table:

Colony.	1897.	1898.	1899.	1900.	1901.
New South Wales.....	\$5,296,762	\$6,066,605	\$8,591,270	\$5,813,136	\$4,483,473
New Zealand.....	4,770,158	5,259,183	7,363,856	7,005,823	8,534,470
Queensland.....	12,424,861	16,017,860	13,811,706	13,975,172	12,369,654
South Australia.....	462,575	530,811	481,638	401,107	453,519
Tasmania.....	1,407,591	1,267,618	1,593,998	1,538,884	1,436,506
Victoria.....	15,821,303	16,298,045	16,633,697	15,528,710	15,099,804
Western Australia.....	12,482,461	19,420,732	30,845,416	29,236,039	34,502,780
Total.....	52,665,711	64,860,854	79,321,581	73,498,871	76,880,206

ESTIMATED PRODUCTION OF CRUDE GOLD IN AUSTRALASIA SINCE THE YEAR 1851.

[From returns furnished by the government of each colony.]

Year.	New South Wales.	New Zealand.	Queens- land.	South Aus- tralia.	Tas- mania.	Victoria.	Western Aus- tralia.	Total.
1851-1884, in- clusive.....	<i>Ounces.</i> 9, 596, 642	<i>Ounces.</i> 10, 552, 279	<i>Ounces.</i> 4, 529, 280	<i>Ounces.</i> 154, 628	<i>Ounces.</i> 378, 413	<i>Ounces.</i> 53, 023, 985	<i>Ounces.</i>	<i>Ounces.</i> 78, 235, 227
1885	103, 736	237, 371	310, 941	18, 327	37, 317	735, 218	.....	1, 442, 910
1886	101, 416	226, 668	340, 998	21, 115	31, 014	665, 396	302	1, 386, 909
1887	110, 288	203, 869	425, 923	37, 371	41, 751	617, 751	4, 873	1, 441, 826
1888	87, 503	201, 219	481, 643	16, 763	39, 610	625, 026	3, 493	1, 455, 257
1889	112, 948	203, 211	739, 103	20, 833	33, 050	614, 839	15, 493	1, 739, 477
1890	127, 460	193, 193	610, 587	24, 831	20, 510	588, 560	22, 806	1, 587, 947
1891	153, 335	251, 996	561, 641	28, 700	48, 769	576, 399	30, 311	1, 651, 151
1892	156, 870	237, 392	605, 612	38, 974	43, 278	654, 456	59, 548	1, 796, 130
1893	179, 288	226, 811	616, 940	33, 820	37, 687	671, 126	110, 891	1, 876, 563
1894	324, 787	221, 615	675, 000	35, 844	57, 873	716, 955	207, 131	2, 239, 205
1895	360, 165	293, 491	623, 000	47, 343	59, 964	740, 086	231, 513	2, 355, 562
1896	296, 071	263, 722	638, 000	29, 004	62, 586	805, 087	281, 265	2, 375, 735
1897	292, 217	251, 645	807, 928	29, 764	60, 646	812, 765	674, 994	2, 929, 959
1898	340, 494	280, 175	920, 048	49, 372	69, 549	837, 258	1, 050, 183	3, 547, 079
1899	509, 418	389, 558	946, 771	32, 990	83, 992	854, 500	1, 643, 876	4, 461, 105
1900	345, 650	371, 993	963, 189	29, 397	81, 175	807, 407	1, 580, 950	4, 179, 761
1901	267, 061	455, 561	835, 553	27, 490	78, 700	789, 562	1, 841, 498	4, 295, 425
Total.....	13, 465, 349	15, 061, 769	15, 632, 157	676, 566	1, 265, 884	65, 136, 376	7, 759, 127	118, 997, 228

From the above table it will be seen that Western Australia and South Australia were the only colonies which increased their production, the former making a gain of over \$5,000,000, its total product being almost as much as that of all the other colonies combined. This result was secured by the opening of some new mines, a largely increased yield from some of the well-known properties, and the partial success in treating some of the low-grade ores by various processes.

Victoria holds second place, and shows a comparatively slight decrease. The large diminution in the product of Queensland was due to the prolonged drought and scarcity of water and to the working out of the heaps of tailings which had been accumulating for years.

The gold product of New South Wales has long been a very variable quantity, and the loss which it sustained in 1901 was also in great part due to the drought. The heavy falling off in placer mining is traceable to the scarcity of water, and also, in part, to the diversion of labor to the coal mines and other industries.

The production of Tasmania and South Australia is comparatively small and does not materially affect the general result. New Zealand shows a relatively very large gain—about 22 per cent—a part of which can be credited to the extensive dredging operations in the colony; more, however, is the result of the success in deep mining in the Hauraki and other districts, and to the better saving secured with some of the ores.

SILVER.

Owing to the fact that a large proportion of the silver produced in Australia is exported in the form of ore and silver-lead, it has always been exceedingly difficult to estimate the amount of the product.

In answer to this Bureau's interrogatories, Mr. W. J. Weatherill, United States consular agent at Brisbane, states that Queensland's silver output in 1901 amounted to 571,561 crude ounces, of the commercial value of £62,241, or \$302,896, equivalent to 504,827 fine ounces, which would represent a United States coining value of \$652,705.

Mr. Frank Dillingham, United States consul at Auckland, states that the silver production of New Zealand amounted in 1901 to £38,879, which would represent, at the average price of silver for the year, viz, 60 cents per fine ounce, 315,341 fine ounces, of the United States coining value of \$407,421.

The United States consul at Hobart, Mr. A. G. Webster, states, replying to this Bureau's interrogatories, that Tasmania's only production of silver was in the form of silver-lead, and that the value of the ore and bullion was \$1,583,242. While it is impossible to say how much of this value was represented by the fine silver contents, the value of the lead and other constituents must have been large.

According to the final Report of the Department of Mines of Western Australia, the production of silver in Australasia in 1901 was as follows:

Colony.	Bullion.		Ore.	
	Weight.	Value.	Weight.	Value.
	<i>Fine ounces.</i>		<i>Tons.</i>	
Western Australia	60,869	£7,609		
New South Wales	448,501	50,484	417,078	£1,803,979
Queensland	571,561	62,241		
Tasmania			28,774	207,228
South Australia			1,514	12,067
New Zealand	571,131	65,258		
Total	1,652,065	185,592	447,366	2,023,274

It is stated that the product of New South Wales includes 16,921 tons of silver-lead. Basing the calculation upon figures contained in the semiannual reports of the Broken Hill Proprietary Company, the largest silver producer in Australasia, it is estimated that in the value given for the product of New South Wales—£1,803,979—not less than £600,000 represents metals other than silver.

Although the report states that the ounces given for bullion are fine ounces, this is believed to be an error; the fine ounces are therefore estimated from the values.

The silver product of the colonies for the year 1901 consequently appears to have been as follows:

Colony.	Value.	Commercial value in United States money.	Quantity.	United States coining value.
			<i>Fine ounces.</i>	
Western Australia	£7,609	\$37,029	61,713	\$79,790
New South Wales	1,254,463	6,104,844	10,174,760	13,155,245
Queensland	62,241	302,896	504,820	652,696
Tasmania	207,228	1,008,475	1,680,790	2,173,143
South Australia	12,067	58,724	97,870	126,539
New Zealand	65,258	317,578	529,290	684,335
Total	1,608,866	7,829,546	13,049,243	16,871,748

As the amounts of ore and silver-lead credited to Tasmania and to South Australia are comparatively small, no deduction for the base metals is made from the product of these colonies.

Australasia's total silver product for 1900 was estimated at 13,340,263 fine ounces, of the commercial value of \$8,270,963, representing a United States coining value of \$17,248,016; there was therefore a loss

of 291,020 fine ounces, or 2.18 per cent, and a decrease in commercial value—due to both the loss in quantity and the fall in price—of 5.3 per cent.

The production of fine silver in Australia during the last four years is shown in the following table:

Colony.	1898.	1899.	1900.	1901.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
New South Wales.....	8,802,600	10,522,488	10,600,000	10,174,760
Victoria.....	57,100	58,439		
Queensland.....	54,700	127,381	99,779	504,820
South Australia.....	4,900		141,647	97,870
Tasmania.....	1,400,600	1,825,323	2,192,845	1,680,790
New Zealand.....	171,200	203,967	277,782	529,290
West Australia.....			28,210	61,713
Total.....	10,491,100	12,737,598	13,340,263	13,049,243

WESTERN AUSTRALIA.

[From the Report (Preliminary) of the Department of Mines of Western Australia for 1901.]

The gold production of western Australia for 1901 was the highest on record; substantial increases appear in the yield of the Murchison, East Murchison, Mount Margaret, North and East Coolgardie, increases ranging from 39 to 18 per cent as compared with the previous year's output. On the other hand, many of the gold fields show a decreased yield; this is especially noticeable in the gold fields from Peak Hill northward. In some of the fields, such as the Ashburton, Gascoyne, and Kimberly, where there is a total absence of effective reducing plants, the decrease is accounted for by the partial working out of the known shallow alluvial deposits, while in others, such as the Pilbarra and West Pilbarra, many of the workings have reached water level and have been abandoned. The mines on the East Coolgardie gold field still maintain their richness, and with improved reduction plants have raised the production of that field alone to nearly a million ounces. Outside the known mining centers no discoveries of note were made during the year.

The Phillips River gold field, which was declared during 1901, has developed but slowly, owing to the absence of crushing facilities.

The area of land leased for gold mining, compared with that in 1900, decreased in 1901 by 1,526 acres, the total in the latter year being 34,498 acres. The largest decrease was in the East Coolgardie gold fields.

The system of the State's erection of batteries for crushing for the public, which was introduced in 1898, has been maintained, and crushing facilities have been afforded to several mining centers hitherto without them. In 1900 the government decided to erect cyanide plants in conjunction with the batteries where the prospects of the district and the amount of accumulated tailings warranted it.

EAST COOLGARDIE GOLD FIELD.

The total reported yield for the year was 991,369 ounces, or 34 per cent more than the previous year and 54 per cent of the total reported product of the State. The average amount won per ton of ore milled was 1.42 ounces against 1.49 in 1900.

MURCHISON GOLD FIELD.

The product of 1901 (146,592 ounces), compared with that of 1900, shows an increase of about 39 per cent. No new alluvial deposits were discovered during the year.

MOUNT MARGARET GOLD FIELD.

This district is second only to the East Coolgardie and it made great progress during 1901, exceeding the output of the previous year by 44,343 ounces, although the average yield per ton of rock treated was nearly 25 per cent less than it was in 1900. Little new country was opened up during the year.

EAST MURCHISON GOLD FIELD.

There was likewise an increased output in this gold field during 1901; it amounted to 18 per cent.

NORTH COOLGARDIE GOLD FIELD.

This gold field reports a production of 148,305 ounces, an increase of 39 per cent when compared with the outturn of 1900, while the average yield per ton of stone crushed was increased from 1.16 to 1.36 ounces.

In the less-known fields results have differed; some, for example the Coolgardie, the Broad Arrow, the Yilgarn, the Dundas, the Peak Hill, the Pilbarra, and the West Pilbarra, have reported decreased products in 1901. The Phillips River field shows some gain.

QUEENSLAND.

According to the annual report of the under secretary of mines, Queensland's gold production for the year ending December 31, 1901, amounted to 835,553 crude ounces, containing 598,382 ounces fine gold, valued at \$12,369,654 in United States money. The yield, therefore, was about 77,600 fine ounces less than it was the previous year, a falling off of more than 11 per cent. This was the least productive year since 1896. The decrease in 1901 is partly accounted for by the drought. There was likewise a slightly diminished average yield per ton of auriferous quartz; in 1900 the mill return was 19 pennyweights 8 grains, while in 1901 it was 19 pennyweights 6 grains; from mill residue the returns were, respectively, 9 pennyweights 22 grains and 9 pennyweights 9 grains for the years under consideration, while the yield from ore treated at metallurgical works was 5 ounces 7 pennyweights 9 grains and 4 ounces 16 pennyweights 12 grains, respectively.

The silver production of the colony is not great, but the year 1901 showed a remarkable improvement over 1900, the increase being nearly 400 per cent; the product for 1901 was 571,561 ounces, worth, approximately, \$303,000, against 112,990 ounces in 1900, worth \$62,000. The value of the silver ore raised in the colony since 1874 amounts, approximately, to \$3,834,000.

The exports of gold and silver for 1901 are exhibited in the following table:

Classification.	Gold.		Silver.	
	Weight.	Value.	Weight.	Value.
Dust and bars.....ounces..	627,534	£2,197,108		
Cyanide.....do.....	227,915	347,852		
Ore.....tons..	872.67	25,442	497.9	£9,651
Bullion.....ouncees..			4,395	432
Bullion (Doré gold).....do.....			47,848	41,461

[From the annual report of the under secretary for mines for the year 1901.]

The decrease of 127,000 ounces in the gold product of Queensland can not be attributed to causes that are at all suggestive of waning productiveness in the mines. The rapid exhaustion of the creek sands and heaps of old tailings that for some years past have served to swell the gold output is responsible for a deficiency of 95,000 ounces, and the scanty water supply at Mount Morgan, necessitating the partial closure of the works for some part of the year, largely accounts for the yield from that mine being 40,000 ounces less than it was the preceding year. The loss from these two sources is thus greater than the total deficiency. Several fields, on the other hand, show appreciable advances.

Of the total yield of gold in Queensland of 835,553 ounces, 812,608 ounces were derived from lode mines and 22,945 ounces from alluvial deposits.

VICTORIA.

[From the annual report of the secretary for mines and water supply for 1901.]

The gold yield of Victoria for 1901 was 17,845 ounces less than it was in 1900, a difference which may be accounted for by the temporary reduction in the yield of some of the oldest and richest mines, four of which, namely, the Long Tunnel Extended, Berry Consols, South German, and Long Tunnel, show a total falling off of 45,000 ounces; there were consequently gains in other mines. We can hardly expect that in a State where gold mining has been a prominent industry for over fifty years each succeeding year will show an increased return.

According to the calculations of the mining registrars, alluvial workings in the colony returned 228,151 ounces and the lodes 502,689, a total of 730,840, which, however, falls short of the actual yield by 58,721 ounces.

The quantity of ore treated was 954,683 tons, and the average yield per ton was 8 pennyweights. 16 grains, making a total of 413,536 ounces; 6,061 tons of concentrates or pyrites, yielding 15,484 ounces; tailings treated by the cyanide process to the extent of 482,278 tons gave 41,990 ounces.

AFRICA.

In 1898 Africa yielded over \$80,000,000 worth of gold, or about 28 per cent of the world's product; in 1900, owing to the war in the Transvaal, it dropped to a little more than \$8,600,000—a loss of 89 per cent. The product for the calendar year 1901 was \$9,087,985, a slight increase over the output of the preceding year, but still not much more than 10 per cent of what may be regarded as the normal annual yield of Africa, and only about 2.8 per cent of the world's product for 1901.

The following table shows whence the output has been derived since 1889:

Year.	Transvaal.		West Coast.		French colonies. ^a		Rhodesia. ^b		Total.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.
	<i>Kilos.</i>		<i>Kilos.</i>		<i>Kilos.</i>		<i>Kilos.</i>		<i>Kilos.</i>	
1889....	11,719	\$7,788,372	1,270	\$844,262	261	\$173,461	(c)	.....	13,250	\$8,806,095
1890....	15,706	10,438,356	1,062	705,705	261	173,461	(c)	.....	17,029	11,317,522
1891....	22,398	14,885,639	1,289	856,730	261	173,461	(c)	.....	23,948	15,915,830
1892....	34,938	23,220,108	1,528	1,011,924	^d 261	173,461	(c)	.....	36,722	24,405,493
1893....	42,573	28,293,831	977	649,695	261	173,461	(c)	.....	43,811	29,116,987
1894....	59,730	39,696,330	865	574,653	261	173,461	(c)	.....	60,856	40,444,444
1895....	66,045	43,893,300	995	661,630	261	173,461	(c)	.....	67,301	44,728,391
1896....	65,874	43,779,669	945	627,938	261	173,461	(c)	.....	67,080	44,581,068
1897....	86,720	57,633,861	751	499,311	640	425,510	(c)	.....	88,111	58,558,682
1898....	119,190	79,213,953	518	343,928	189	125,987	669	\$444,617	120,566	80,128,485
1899....	107,410	71,384,561	422	280,185	344	228,512	1,700	1,129,773	109,876	73,023,031
1900....	9,215	6,124,226	326	216,873	1,115	741,029	2,392	1,589,815	13,048	8,671,943
1901....	8,026	5,333,994	216	143,813	958	636,700	4,476	2,974,943	13,676	9,089,450

^a Includes Madagascar, Algeria, and the French Sudan. (1901 does not include French Sudan.)

^b Includes Mozambique, Cape Colony, and Natal for all years except 1901, which does not include product of Mozambique or Natal.

^c Previous to 1898 Rhodesia and Mozambique together produced 289 kilograms, fine, included in the Transvaal returns.

^d Previous to 1897 the only figures obtainable were those for 1892—Madagascar only.

THE TRANSVAAL.

Mr. William D. Gordon, acting United States consul at Pretoria, states, in answer to this Bureau's interrogatories, that the Transvaal during 1901 produced 8,025.770 kilograms, or 258,032.522 ounces, fine, of gold, valued at \$5,333,994. He states further that no silver mines were at work in the Transvaal during the year 1901, and that the quantity and value of the silver contained in the gold bullion recovered during this period was not recorded. The above figure is about 20,000 ounces in excess of that given in the *Économiste Européen*, June 20,

1902, and in the Board of Trade Journal of London, March 15, 1902, which placed the amount at 238,993 fine ounces.

Africa, outside of the Transvaal, produces comparatively little gold at any time, and, notwithstanding the decrease in the product of the Rand occasioned by the war, the Transvaal continued to lead, although its product was the smallest since the country became a factor in producing the world's gold.

RHODESIA.

Mr. Henry de Smidt, assistant treasurer at Cape Town, writes that southern Rhodesia during the calendar year 1901 produced 172,035 ounces 15 pennyweights 8 grains of gold, of the value of £610,388 13s. 8½d., which would be equivalent to \$2,970,453 and would indicate a fine contents of 143,694 ounces.

The *Économiste Européen* of January 24, 1902, states that the gold production of Rhodesia for 1901 amounted to 172,060 ounces. In previous years the product of Rhodesia was found to be 0.836 fine, and if the yield of 1901 was the same its fine contents would be 143,842 ounces and would be valued at \$2,973,478.

The report of the chamber of mines places the product of 1901 at 172,061 ounces 8 pennyweights, thus agreeing with the statement of the *Économiste*, but gives neither the fineness nor the value; it is believed, however, that its average fineness would not differ appreciably from that of former years; consequently we place the product for 1901 at 143,842 fine ounces, or 4,474 kilograms.

Following is a statement of the product of Rhodesia from 1898:

Year.	Weight.		Value.
	Crude ounces.	Fine ounces.	
1898 (prior to Sept. 1).....	6,470	5,409	\$104,202
1898 (Sept. 1 to Dec. 1).....	18,085	15,119	312,537
1899.....	65,303	54,589	1,128,444
1900.....	91,850	76,779	1,587,168
1901.....	172,060	143,842	2,973,478
Total	353,768	295,738	6,105,829

WEST COAST OF AFRICA.

The product of the west coast of Africa has hitherto been assumed to equal the amount of its bullion exports to Great Britain during the year.

GOLD IMPORTED INTO ENGLAND FROM THE WEST COAST OF AFRICA SINCE 1889.

Year.	Weight.		Value.	Weight, fine.
	Standard (916½).	Fine.		
	<i>Ounces.</i>	<i>Ounces.</i>		<i>Kilograms.</i>
1889.....	44,554	40,841.17	\$844,262	1,270
1890.....	37,242	34,138.50	705,705	1,062
1891.....	45,212	41,444.33	856,730	1,289
1892.....	53,402	48,951.83	1,011,924	1,523
1893.....	34,286	31,429.00	649,695	977
1894.....	30,326	27,798.83	574,653	865
1895.....	34,916	32,006.33	661,630	995
1896.....	33,138	30,376.50	627,938	945
1897.....	26,350	24,154.17	499,311	751
1898.....	18,150	16,637.50	343,928	518
1899.....	14,786	13,553.93	280,185	422
1900.....	11,445	10,491.25	216,873	326
1901.....	7,590	6,956.99	143,843	216

CAPE COLONY.

Mr. W. R. Bingham, United States consul-general at Cape Town, reports, basing his statement upon official information received from Mr. H. de Smidt, assistant treasurer, that the colony produced during 1901 2.4167 kilograms of gold, valued at £301, which would indicate a fine contents of, approximately, 70.8 ounces, worth \$1,465. No silver is produced in the colony.

FRENCH COLONIES IN AFRICA.

MADAGASCAR.

The annual gold production of Madagascar for the nine years from 1889 to 1897, inclusive, was estimated by this Bureau at 261 kilograms, valued at \$173,461, which was the amount of the exports. Subsequently the estimate for 1897 was changed to 601 kilograms, valued at \$399,420, the correction being based on data derived from the *Statistique de l'Industrie Minérale*. The product for 1898 was stated by Ambassador Porter to have been 98 kilograms, fine, or 3,150 ounces, valued at 339,000 francs, or, approximately, \$65,115. The report of the French mint for 1901 places the exports of gold for 1899 at 423 kilograms, valued at 1,184,000 francs, equivalent, approximately, to \$228,512, and those of 1900 at 1,115 kilograms, valued at 3,000,000 francs, or about \$579,000. For the last year the *Statistique de l'Industrie Minérale* places the amount at 1,041 kilograms, valued at 3,586,000 francs, adding that this is a corrected estimate, official figures giving for the stated value of the gold a weight of 1,548.8 kilograms at the average price of 3,070 francs per kilogram.

The Board of Trade Journal, London, July 17, 1902, publishes the following statement of Madagascar's gold exports for 1900 and 1901:

Classification.	Value, 1900.	Value, 1901.
Dust	<i>Francs.</i> 3,323,081	<i>Francs.</i> 3,060,958
Bars.....	264,836	238,718
Total.....	3,587,917	3,299,676

The figure for 1900 does not vary greatly from that given by the *Statistique de l'Industrie Minérale*. Consequently the production for 1900 is estimated at 1,041 kilograms, or 33,468 ounces, valued at \$691,844, and in the absence of other data for 1901 the figures quoted for that year is accepted as approximately correct. This figure would indicate a fine contents of about 958 kilograms, or 30,800 ounces fine, of the value of \$636,692.

The following table contains a statement of Madagascar's gold production from 1889:

Year.	Weight.		Value.
	Kilograms.	Fine ounces.	
1889 to 1896, inclusive.....	2,088	67,129	\$1,387,678
1897.....	601	19,322	399,420
1898.....	98	3,150	65,115
1899.....	423	11,050	228,512
1900.....	1,041	33,468	691,844
1901.....	958	30,800	636,692
Total	5,209	164,919	3,409,261

Although the figure for 1898 is far below the annual average, it is confirmed by the report of the French mint for 1901.

ALGERIA.

Algeria produces no gold and only an insignificant amount of silver. During the calendar year 1900, the last for which we have any report, it amounted to 89 kilograms, which would represent a United States coining value of \$3,699.

PREHISTORIC GOLD MINING.

[From the Mining and Scientific Press, San Francisco, Cal., June 7, 1902.]

Some glimpses of mining when the world was young are afforded by reports of ancient gold mining in Mashonaland, Matabeleland, and Maricaland, British South Africa, where 380 miles of reefs, lately located, cover prehistoric workings. These workings are generally several hundred yards in extent and continuous on the surface. The depth attained rarely exceeds 100 feet, averaging 30 feet. When and by whom these ancient workings were made is a matter of uncertainty.

That an enormous amount of gold has been obtained from these workings in the past is unquestionable. Millions of dollars' worth of gold were derived from these sources. The methods of mining and the reduction of the ores were of course crude. Various theories have been advanced as to the causes of the discontinuance of mining upon the ancient workings. It has been asserted that the veins pinched out in depth, and were in consequence abandoned by the ancients. It is undoubtedly true that in some instances the veins did pinch, and that the ancients, like some of the moderns, ignorant of the fact that such pinching was but temporary in occurrence, abandoned the workings. The tendency to pinch and to open out is a characteristic feature of fissure veins. The fact that levels have been recently driven upon many of the veins below the ancient workings was due to the fact that the veins pinched out in depth. Irrespective of the geological evidence upon this point, controverting the theory of the pinching out of the veins in depth, is the demonstration of the continuance of the veins below the ancient workings. Though the theory of impoverishment in depth explains the abandonment of some of the workings, it has only a limited application. It is probable in many instances the ancients encountered in their exploitations poor zones, and, in consequence, abandoned the veins. The occurrence of poor zones is a characteristic feature of gold mining, and it is not unlikely that had the explorations been sufficiently extended richer zones would have been again encountered. The cessation of mining operations was doubtless ascribable to the incapacity of the miners to cope with the difficulties attending deep mining—increased hardness of the rock, influx of water, inadequate methods of timbering and retaining the ground, refractory condition of the ore, and lack of metallurgical knowledge. Any one or all of these conditions might have obtained with the result that deeper mining would have been rendered impossible under the primitive methods in vogue. It is not improbable that these reefs have in most cases been worked at different periods.

GOLD MINING IN MATABELELAND.

[From the Mining World and Engineering Record, London, May 24, 1902.]

Though phenomenal success has not attended gold mining in Matabeleland, yet the results have been fairly encouraging. Mr. G. R. Carey, an associate of the Institution of Mining and Metallurgy, read a paper before the members of that body on April 17, and was well qualified to do so from the fact that his experience was gained in the selection and opening up of claims for one of the leading parent companies in Rhodesia. He did not, however, for obvious reasons, specify the various properties on which the operations took place. He considered the subject from the threefold point of view of—

- (a) Geological formation and vein characteristics.
- (b) Significance of ancient workings.
- (c) Opening up claims.

The mass of the country is granite, but interspersed with large patches of slates and schists, varying in size from 20 miles long by $2\frac{1}{2}$ miles wide to 50 miles by 25 miles, and forming in all from one-fourth to one-third the total area of the country. He found that the latter have a strike somewhat north of east and south of west, and

are traversed in all directions by numerous dikes of many kinds, the various greenstones being, perhaps, most abundant. Mr. Carey, in his paper, deals with volcanic formations, alluvial deposits, the origin of metaphoric rocks, the occurrence of minerals, alluvial gold, and gold in veins, the latter being the principal source of the gold production. Auriferous veins also occur in granite, syenite, and quartz-diorite, and in the volcanic rocks. They strike in various directions, and within the limit of my work no definite systems were recognizable. The color and other characteristics of the quartz vary considerably, but he has not been able to find that they afford any indication of the gold contents, quartz identical in appearance being in some cases rich, in others barren. White opaque, blue-gray of various shades, and a friable grayish semitransparent quartz are the commonest varieties. Enormous buck reefs of dull-white quartz, sometimes forming lines of small kopjes, are of not infrequent occurrence. Some appear to be mineralized, their outcrops carrying iron and other oxides, but they are absolutely barren of gold. Others resemble quartzite rather than quartz, and look as hungry as they are. The author discusses the types of veins in Matabeleland, and shows how very carefully he has studied his subject. His paper must be read as a whole for justice to be done to the author and the reader alike. He has adduced sufficient evidence to prove that gold is of a very extensive occurrence throughout the metamorphic and volcanic areas of Matabeleland, and though some of the formations described have not appeared entirely favorable to successful mining, it must not be assumed that Matabeleland is poor in payable ore. A large body of veins of true fissure character has hardly been more than mentioned, for no other reason than that owing to their simplicity, persistence, and strength they present comparatively few difficulties in exploiting. Yet these alone are sufficient in wealth and number to cause Matabeleland to rank high among the gold-producing countries of the world. The author says: "In every gold-mining center are many nonprofitable reefs, which in most countries are passed over or abandoned by the prospector as soon as their worthlessness becomes apparent to him, and never become the object of commercial enterprise. In Matabeleland, however, where auriferous reefs are patent to everyone by their old workings, commercial enterprise seized on all indiscriminately without waiting for slow selection by the prospector, taking upon itself this task and relying on the probability of some among a vast number of holdings proving successful to insure against failure. Under these conditions unprofitable reefs are brought into commercial notice to an extent that does not obtain in countries where individual prospecting is more prevalent; but I have no reason to suppose that in Matabeleland they are relatively more numerous than in the districts of California, Mexico, or Colombia I had previously visited."

The Institution of Mining and Metallurgy, by the publication of such papers as these, is doing a very great service to the mining industry. We are pleased to note that, in Mr. Carey's opinion, as the country becomes more opened up by railways, as transport is cheapened, and also supplies, greater economies for working in Matabeleland are possible, and, indeed, certain.

GOLD IN THE IVORY COAST.

[From the Board of Trade Journal, p. 346, February 20, 1902.]

The *Dépêche Coloniale* of 9th and 10th instant states that gold is very abundant in the Ivory Coast, probably as much so as in the neighboring British colony of the Gold Coast. The gold is found at a certain depth. According to information supplied by M. Camille Dreyfus, a clayish soil is first met with which sometimes contains gold, but only in small quantities. At an average depth of 4 meters, but sometimes as much as 10 meters, a species of white sand is found which is no other than pulverized quartz; this is the bed of the gold.

The presence of auriferous deposits has been shown in the elevated districts of the circle of Assinie and in Indénié, where it has been found that the granitic formation was auriferous. Near Zaranou gold is worked and is the principal resource of the country. In the district of Alangoua gold mines were worked by a band of adventurers of all nationalities. Generally speaking, the metal appears to exist in quantities sufficient for working in the whole of the Haut-Comoë region. Gold is abundant in Assikasso, this region being rich in auriferous quartz, although situated at some distance relatively from the coast. Attié, in the circle of Grand-Bassam, is said to form a vast field of gold, and the metal is also found in Akapless on the banks of the Onoulagoon and on those of the Haut-Comoë, between Alépé and Malamalasso. Other deposits have been discovered in the Haut-Cavally, and there is an active working in Baoulé. The gold produced in the mines of Kokombo, which have been worked for some years by the principal native chief, is either gold dust or very small grains.

Up to the present the gold has been extracted by natives alone, and their processes are most primitive. The natives who work the Kokombo mines dig a series of pits in each vein of the metal, varying from 20 to 30 meters in depth, and extract blocks of ore, which are pulverized to a fine powder by the women. The lack of water during a part of the year necessitates two different methods of extracting the ore. During the dry season the natives work the pits by the side of streams, wash the alluvial soil, and extract sufficient dust and nuggets to make the occupation very remunerative. In the rainy season gold is extracted entirely by the villagers. They dig deep pits, crush the quartz, and thus obtain the nuggets. By this process all the gold dust is lost.

The following figures are given as showing the quantity and value of gold exported from the Ivory Coast during each of the six years ended 1900:

GOLD IN THE IVORY COAST.

Year.	Quantity.	Value.
	<i>Kilograms.^a</i>	<i>Francs.^b</i>
1895	211. 902	656, 896
1896	296. 244	918, 356
1897	159. 7	495, 070
1898	101. 017	313, 152
1899	33. 408	103, 564
1900	8. 078	25, 042

^a Kilogram = 2.2 pounds.

^b Franc = 9³/₄d.

For some years now European prospectors have explored certain parts of the country, notably in the circle of Assinie, Onoulagoon, and the borders of the Comoë, Attié, and Alangoua, but up to the present these explorations have not been followed by any serious attempt to work the metal with the machinery usually employed by European gold seekers.

WEST AFRICA.

[From the Economist, London, April 12, 1902.]

The Wassan mine in West Africa has been producing gold in comparatively small quantities since 1882. Its best year was 1897, when it was 7,255 ounces, but so little have all the new mines contributed to the production that the total export of gold from the whole district in 1900, the last year for which statistics are available, amounted to only 10,557 ounces. The ominous feature about it is, too, that instead of expanding the gold production has been steadily declining, since in contrast with the return for 1900, stated above, the output in 1896 reached 23,940 ounces, valued at £86,186.

THE GOLD PRODUCT OF WEST AFRICA.

[From The Economist, London, December 28, 1901, p. 1939.]

It is remarkable to find, from the report on the Blue Book of the Gold Coast, by Mr. C. H. Hunter, the acting colonial secretary, that in spite of the millions raised for the exploitation of the gold industry of west Africa, the export of gold is actually declining instead of increasing. For the year 1900 the exports of the precious metal were valued at the comparatively insignificant sum of £38,007, or less than half what it was five years before.

The quantities and values of the gold exported in recent years are stated as follows:

Year.	Ounces.	Value.
1896	23, 940	£86, 186
1897	23, 554	84, 797
1898	17, 732	63, 838
1899	14, 249	51, 300
1900	10, 557	^a 38, 007

^a According to Mines and Quarries for 1900, Part IV, Colonial and Foreign Statistics, published by the British Government, the gold exported in 1900 amounted to 12,774 ounces, and was valued at £51,062.

Mr. Hunter says that "the decline is due, it is believed, to new systems of development being introduced and old mines being closed down." That seems rather an odd explanation, since it is difficult to understand why the old mines, if they were paying, should be closed down before the "new systems" were got to work. In view of the large amount of money invested in the district, a more convincing explanation of the lack of expansion in the gold output would be of interest.

MOZAMBIQUE.

[From *L'Economiste Européen*, March 14, 1902.]

Thus far few of the mines of Manica have entered upon the period of regular production; the work has been chiefly directed to locating the vein and ascertaining the amount of gold in the mineral. In the Transvaal the work of prospecting is much less difficult because the gold, as a rule, is found in regular and unbroken veins, frequently several kilometers in length; at Manica the veins are much more irregular and they constantly change their direction and inclination.

Fortunately, diorite often reveals their presence, which is confirmed by outcroppings of talcose schist, which appears in many places.

The country, which is much rougher than the Rand, favors the formation of alluviums, which frequently cover the vein; a luxuriant vegetation—not found in the south—renders the work of the prospector still more difficult.

The gold appears not only in veins, but also in the alluvial bottoms of certain streams which descend from the mountains which held it. This is due to various causes, the chief of which are the abundant rains, which quickly transform these little streams into deep rivers, disintegrate and decompose the auriferous quartz and wash down the gold together with the sand. In Portuguese territory, the chief gold-bearing streams are the Menene, Zambuzi, Révué, Chua, Inhamassanga and Chimeze; in English territory, among others, are the Metari, Odzi and the Inhamucarara.

For the profitable working of the mines of Manica three things are necessary: a large amount of mineral, the use of scientific methods in treating the gold, and ample and cheap labor.

On the first of these conditions opinions are in perfect accord. The principal veins have been located and their depth in many places exceeds 200 meters. Regarding the scientific processes, there is no doubt that they may be applied just as they are in the Transvaal. As to the labor, the work of the natives is no dearer than it was in the South African Republic.

Coal, moreover, exists near at hand in Rhodesia, and there are indications of its presence in the valley of the Pungue, between Chirnoio and Fontesville; there is also an abundance of wood for fuel, and many of the mines might dispense with all fuel by using electric motors driven by the water power of the falls of the Révué, the Zambezi, the Chua, and the Menene.

Such are the conditions of Manica. What this region has wanted heretofore to make it a gold-producing country of the first order is the organization of a powerful company with sufficient capital to enable it to work the mines in a scientific practical way.

GOLD IN MOZAMBIQUE.

[From *L'Economiste Européen*, March 21, 1902.]

The alluvial deposits of Manica are due to the crumbling away of veins, the débris being carried but a short distance, or are simple alluvial deposits washed along. In the former case the gold, which is found in grains or small masses, has been carried along but a short distance by the erosive agents from its original resting place; it therefore is easily collected. In the second case, the gold has been carried along by water mixed with the gravel and is finally deposited where the unevenness in the ground offers it a resting place.

The alluvials are always richest near the bed rock, the nodules naturally finding a secure resting place in the interstices of the rock.

The recent improvements in the methods of working by means of dredging, which have been revived so successfully in Australia and New Zealand, might be adopted in Manica. The ground is especially well adapted for this, the depth of the alluvials ordinarily not being more than 20 feet above the level of the stream.

The deposits cover an area of several thousand hectares and, although their average depth is not great, in places it is from 12 to 15 metres. This is frequently the case in the valley of the Menene. Of all the property belonging to the Mozambique

Company that of Saint Lament offers the best means of judging of the value of the deposits. Here several pits were sunk and a long trench was dug for the purpose of prospecting; the latter was $1\frac{1}{2}$ kilometers in length and in depth varied from 2 to 3 meters, to the level of the Révulé. Twice this trench struck bed rock and it uncovered a large amount of auriferous sand.

Every 20 meters a sample of 750 kilograms was taken and the result of washing all the samples was 5 pennyweights per cubic meter of sand. In the formation there was first a layer of sand mixed with clay of variable depth but which averaged 3 meters, with here and there little beds of pebbles and clay. Above is the auriferous sand with an average depth of $1\frac{1}{2}$ meters and mingled with round pebbles superimposed upon the bed rock.

The present method of working alluvials would render the alluvials of the Révulé very remunerative. In Australia and New Zealand the cost of dredging a cubic yard is about 2d., and under favorable conditions this may be reduced.

Supposing that the yield of the alluvials of the Révulé were only one-fourth of that obtained in the prospecting—that is, 1 pennyweight per cubic yard—they would yield 36d. Since to obtain 1 cubic yard of sand it would be necessary to remove 3 cubic yards of almost sterile *débris*, it would cost about 8d. per cubic yard of sand. As one dredge can easily dig 1,500 cubic meters per day, there would be a profit of about £43, or about £16,040 for the two hundred and eighty working days of the year.

Admitting that the cost of dredging a cubic yard might be three times the amount given above, there would be a total profit of £5,000, which would be ample to pay the dividends and for the wear and tear of machinery.

The veins of Manica vary greatly in size; some are only a few centimeters long while others run as high as 10 or 12 meters. They are highly ramified, but notwithstanding this fact are easily worked.

The gold is found both free and associated with iron pyrites; this is the shape in which it is found at deep levels. In the Beaganee mine, 150 feet down, the gold is always free, the pyrites no longer appearing.

Sometimes very beautiful specimens of auriferous quartz are found in the veins, always accompanied by traces of iron due to the decomposition of the pyrites.

While the mining camp of Manica is not the Rand, it is richer than almost any camp in Rhodesia, and the latter country already exports thousands of ounces annually. The camp of Manica is also as rich as those of the Transvaal, Johannesburg excepted, and as many others of Australia, of New Zealand, etc., which have yielded so many tons and have been the chief source of the wealth of those countries.

[From Consular Reports, July, 1902.]

Consul W. S. Hollis transmits from Lourenço Marquez, March 25, 1902, clipping from a local paper giving further particulars in regard to the gold discoveries in Gazaland, which reads, in part:

"South Africa has often been described as the country of wonderful surprises. It had been thought that the biggest and the greatest of the later developments, at least in the southern portion of the continent, had happened on the Rand; but portions of Rhodesia are showing good results, and in other parts of South Africa we find rich indications.

"But it is not only in the British portion of South Africa that gold-bearing soil has been discovered; in the extensive portion of the subcontinent comprised in the Portuguese province of Mozambique rich discoveries have been made. Recently the Macequece gold fields have claimed a large share of attention on the part of the investing public, whose confidence bids fair to be justified. The fields in that direction promise the best results. Latest of all, we have the valuable find in the Uanetz district. Here, it has been ascertained, there exists the true conglomerate as we find it in the Witwatersrand soil. The reef, as we have been informed, is an extensive one, and has been traced for miles. Something like 7 miles have already been taken up. The district is situated fairly well to the north of Incomati, near to the Transvaal border. The district is healthy, and, from a mining point of view, there are the supreme advantages of an abundant water supply and an almost inexhaustible stock of timber. As for the financial element, we may state that a syndicate to further prospect and work the fields has been fully formed, and consists mainly of Lourenço Marquez gentlemen. Good financial support has been forthcoming and ultimate success is confidently anticipated."

[From O Futuro, Lourenço Marquez.]

Some six months ago striking reports reached Delagoa Bay of a wonderful discovery of gold somewhere in Gazaland. Now we have further information on the point.

The gold is there in large quantities. There is, first of all, a quartz reef showing "visible" very rich. We have seen good specimens of the ore and it is much the same as that of the "Sheba," at Barberton.

The extraordinary thing is that, in the same region, conglomerate similar to that in the Rand has been struck. A sample was sent to Johannesburg and was subjected to the fine test; it gave excellent results. This conglomerate extends over a large area.

GOLD IN MADAGASCAR.

[From Consular Reports, December 28, 1901.]

News recently received from Madagascar indicates that the island is about to justify the hopes which have been entertained by numerous engineers as regards mineral resources.

Circumscribed auriferous regions, said to be very rich in the precious metal, are being worked on the eastern slopes and near the port of Manangary. The gold is in the form of small nuggets or of dust, taken from the alluvial deposit carried down by two streams from a neighboring mountain. It is supposed that the metal is derived from the disintegration of rocks situated at the origin of these streams, at a point not yet determined, and that there will be found the principal lode.

The washing of the alluvial deposit is effected in a kind of large wooden dish, in which the auriferous earth is placed—a very primitive method, but for the present sufficiently remunerative.

The work is mostly done by the natives under the direction of Europeans, as they alone can stand the rays of a tropical sun, as well as remain in the water for hours each day.

Already two prospectors have discovered blocks of quartz which they estimate as capable of furnishing 4 ounces to the ton. Traces of the metal have been found more or less over the whole island.

HILARY S. BRUNOT, *Consul*.

ST. ETIENNE, *December 3, 1901.*

MINING LAWS OF MADAGASCAR.

The President of the French Republic signed, last February, a new code of mining laws applicable to Madagascar, and it was published in the colony on the 29th of March.

The changes introduced mainly refer to increased facilities in procuring prospecting and mining licenses, as also a wider choice in the selection of lands for extracting gold, the precious metals, and precious stones. There are advantageous clauses relating to transactions by power of attorney and the transfer and mortgage of mining property.

WILLIAM H. HUNT, *Consul*.

TAMATAVE, *April 15, 1902.*

GOLD MINING IN EGYPT.

By CHARLES J. ALFORD. Abstract of paper read before the Institution of Mining and Metallurgy in London, October, 1901.

[From The Engineering and Mining Journal, New York, January 18, 1902.]

The history of gold mining, indeed of all mining, in ancient Egypt is lost in antiquity. Vague rumors of ancient workings and of the ruins of mining towns in the eastern mountains have long been known, and some of the few travelers who have crossed the desert from the Nile to the Red Sea have mentioned them in a cursory manner; but nothing definite has been written or known about them until in the winter of 1899-1900 an expedition was sent out under the superintendence of the author of this paper by the Victoria Investment Corporation of London, with the express purpose of searching for and reporting on these ancient mines.

* * * * * *

Prof. A. H. Sayce, the well-known Egyptologist, is of opinion that the Eastern Desert, between the Nile and the Red Sea, supplied gold, not only to Egypt, but to Assyria, Babylon, Persia, and the other countries of Western Asia. The ancient rec-

ords, as now interpreted, indicate that mining was carried on as early as 2500 B. C., and there was still some mining done as late as the times of the Ptolomies.

* * * * *

To the eastward of the belt of cultivation along the Nile is a sandy waste, part of which can be seen from the river, but this in no way represents the whole country between the Nile and the Red Sea. At Kench, in latitude 26° north, the sandy zone, which forms the true desert, is but 20 miles wide, while in the latitude of Assouan it is fully 150. To the east of this and bordering the coast of the Red Sea is a chain of lofty and rugged mountains, 50 miles wide, several of whose peaks attain an altitude of 8,000 feet above the sea, and the general altitude of the divide of the watersheds is from 1,500 to 2,000 feet. It is this belt of mountainous country that forms the mining district.

* * * * *

The crystalline rocks which constitute the mountain districts to the east are of the oldest geological series met with in Egypt. The larger mountain masses are usually formed of a hornblendic granite with pink orthoclase, which gives the whole a strikingly red appearance when seen from a distance. Surrounding these, in the lower ranges and covering very extensive areas, is a rather fine-grained gray granite, passing in places into gneiss and that into mica schist, traversed by dikes and intrusions of greenstone, felsite, porphyry and a very fine-grained white elvan granite. It is in these rocks that most of the auriferous quartz veins were found to occur, and the more the granite was cut up by the intrusive rocks the more frequent and more promising the quartz veins appeared to be. In some districts masses of crystalline schists were found to occur, but the numerous rock specimens collected by the expedition have not yet been accurately determined, and until that is done it is useless to attempt to describe these rocks in detail.

Overlying the crystalline rocks on either side of the mountains is the very large and geologically important formation known as Nubian sandstone, which appears to have been laid down on the eroded surface of the older rocks. This sandstone usually appears in well-defined strata of red, brown, and gray quartzose rocks, in many respects resembling the Old Red of Western England. Some parts are heavily charged with oxides of iron and manganese, and nodules of hard siliceous hematite are of frequent occurrence. The whole mass, both sand grains and cementing material, is entirely siliceous, with the exception of a few small local veins of sulphate of baryta, and a little gypsum. Excepting only some fragments of silicified wood, found near the Wady Allowi, on the route westward from Assouan, no organic remains or fossils of any kind were found in these rocks. The strata are usually horizontal or nearly so, but the general dip is toward the north in common with all the stratified rocks of the country. At the base of the sandstone beds occur local deposits of a rough quartzose conglomerate with beds of variegated sands and sandy clays. Immediately overlying the crystalline rocks in several places are large lenticular deposits of a very hard dark-colored conglomerate, formed entirely of pebbles of these crystalline rocks, the pebbles varying in size up to large boulders. This beautiful rock is the ancient ornamental breccia of the Romans and was largely worked by them in the quarries of Hammamat, on the Kench-Kosseir road, where a very extensive mass of it occurs. It is of much more frequent occurrence in the northern than in the southern districts, but the overlying Nubian sandstone attains an immense development toward the south, and it is impossible to say what it may cover.

Above the Nubian sandstone, and apparently unconformable to it, occur beds of cretaceous origin, which are best seen at the surface about the neighborhood of Edfu and Rhodesia, in the Nile Valley, and extend to the northeastward of Kench, skirting the lower parts of the escarpments of the Tertiary strata. It is in the lower beds of this series that deposits of coal or carbonaceous matter of some kind are reported to have been detected, but this most important matter requires verification. Above the sandstone are to be seen first a series of ferruginous sandy shales, passing into black shales, with carbonaceous matter and impressions of leaves, and it appears to be in further local developments of these beds that the coal deposits should be looked for. Above these are some calcareous sandstones with fragments of fossil wood, and beds of hard limestone with fossil mollusca, also local beds containing phosphates and fish remains. The cretaceous limestones occur at a short distance eastward of Kench and Luxor, and also as an outlier on the crystalline rocks eastward toward the Red Sea, but they do not appear to extend south of a line drawn in a northeasterly direction from Edfu to Kosseir.

The Tertiary nummulitic limestone and other rocks overlying the cretaceous strata are not largely represented in the district under consideration, nor do they form a factor of any importance for the purpose of this paper.

The question of the water supply of these eastern regions of Egypt has always been looked upon as very serious, and the present scarcity as an almost insuperable obstacle to mining, or, indeed, any work in the country. To this the writer does not assent. Under present circumstances water is certainly scarce, especially in the lower districts on the sandstone strata, but in the eastern mountains there are few, if any, districts where a supply could not be got with a little work.

The so-called wells of the Bedouin are nothing but holes grubbed with the hands in the sand of the wady beds; and as these stand for months untouched and unvisited the water stagnates and sometimes absorbs saline matter from the surrounding sands, and the holes become blocked with sand and débris. The "gults," or natural rock reservoirs, are no better, as most of them dry up shortly after rain has fallen, and others stagnate and become foul. The Bedouin has the greatest aversion to showing anyone the water holes, and whenever possible says there are none, believing that nothing but the reputed want of water keeps all the nations of the earth from his beloved deserts, and, unfortunately, the presence of strangers has hitherto meant to him nothing but oppression and extortion.

All through the country, at the ancient mining sites and at all the old roadside stations, are abundant evidences of former water supply, in the form of cemented tanks, reservoirs, and catchment arrangements, and many well-made masonry wells, all now completely choked with sand. Indeed, many bear traces of intentional destruction. The first work toward reopening the mines must be to put some of these in order and provide an adequate water supply, and it will not be difficult or very expensive. The want of timber and fuel in the country is more serious than the present scarcity of water, but as both of these will have to be supplied from the outside the question really resolves itself into one of transport. In the absence of cheap coal, petroleum will probably commend itself as a fuel for small engines. The cost of English coal at Luxor, on the Nile, is now \$8.50 per ton, and it could probably be put down at the Fatira mines at \$11. Camel carriage of any material will cost about 2 cents per mile per load of 300 or 400 pounds, and camels are readily obtainable. The mines on the coast would have a great advantage in being supplied by sea from Suez, which is not more than forty-eight hours steamer run from any port on the coast of the district. A railway has been projected and surveyed between Kenel and Kosseir, which would pass close to some of the mines, but the scheme is at present in abeyance. These questions apply rather to the future than to the present, as the first exploration and development of the mines will require no machinery and very little timber, and the carriage of the necessary stores and tools will not be a serious matter.

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During the last twelve months the work of exploring the country and the ancient mines has been pushed on energetically by the Egyptian Mines Exploration Company in the district above described, while the Egyptian Development Syndicate has commenced work in the peninsula of Sinai, but the latter appears at present to be confining its operations to a search for turquoise rather than gold. These companies are working on large prospecting areas granted to them for a time by the Egyptian Government, with the right to locate and hold, on certain specified terms, any mines found therein, a system admirably adapted to the country, in which the presence of the independent strolling prospector would be particularly undesirable. Several other prospecting areas have been granted, and within a few months exploration work will be commenced by the Egypt and Sudan Mining Syndicate, and probably others also.

At Um Rus, on the western coast of the Red Sea, about 240 miles south of Suez, the exploration of one of the ancient gold mines was commenced last December by the Egyptian Mines Exploration Company, under the superintendence of the author of this paper, and so far the results have been decidedly encouraging. The mine is about 4 miles from the Red Sea, where there is a good natural harbor, named Imbarak, in which any moderate-size vessel can anchor and lie in perfect safety.

At this point, over an area of about 3 square miles, occur a large number of quartz veins outcropping in a country of gray granite much intersected by dikes of greenstone, porphyry, and felsite. Nearly all of these veins have been more or less worked in ancient times, and some of them to very considerable depths. In the Wady Imbarak, south of the mine, are ruins of a large ancient mining settlement and remains of huts are scattered all over the neighborhood. The country is very rough and mountainous and intersected by numerous wadies, which, when the heavy rain storms break in the mountains, bring down large volumes of water. Across one of the smaller wadies a dam is now being constructed to conserve a supply of water for the mine. The exploration work was commenced on one of the largest of the ancient workings, where two veins of quartz outcrop in the cliff on the north side of a wady.

These had been both very extensively worked by the ancients, who appear to have had a clear idea of the nature of ore shoots, as they worked certain zones of the veins—in one case a length of 700 feet—entirely out, leaving hardly a trace of quartz in their old stopes, while other and less rich portions of the veins were left untouched. It is noticeable that whenever a piece of quartz can be found in any of these old stopes it generally shows a good result in gold, while the untouched portions of the veins are generally poor.

In view of this, the scheme of exploration is to get below the level of the old workings, and then to drive underneath them and thus to get into the ore shoots worked by the ancients. A shaft is now down on the vein at this point for 130 feet, and has not yet bottomed the old workings. Several crosscuts are also being driven with a view of getting under other ancient workings from which also rich specimens of gold-bearing quartz have been obtained. The veins outcrop along the face of the cliff above the wady and dip at an angle of 45° to the northwest. Their thickness varies generally from about 1 foot to 3 feet, but in places they are much larger, and there is a constant though variable yield of gold, which is always free milling. The quartz is hard, and white to gray in color, in places carrying a little pyrites, but neither at Um Rus nor any other place in the district has anything else been found in it. In most places the veins have a fairly good gouge, separating easily from the country, and frequently they are found to follow along the sides of porphyry and other dikes.

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Perhaps the most serious question in connection with Egyptian mining at present is the cost of fuel. A very fair charcoal is made in the country by the Arabs, but the supply is limited. English coal at Suez costs \$11 per ton, and on the Nile, at Keneh, \$8.50. It is possible that if a large demand were created Indian coal could be put down at Red Sea ports at less prices than these, or the use of petroleum might be cheaper; but as the high price of European coal at Suez is largely caused by the heavy canal dues all fuel coming from that direction would be equally affected.

The exposure of the crystalline rocks, in which the ancient gold mines of Egypt were worked and in which search for deposits of metalliferous minerals may be undertaken with prospects of success, commences about Jebel Zeit, at the south end of the Gulf of Suez, and extends in varying width along the coast line of the Red Sea, with few and slight interruptions for 700 miles, until it joins the mountains of Abyssinia. At Um Rus the mountain chain of crystalline rocks is about 60 miles in width from east to west, while 100 miles south it decreases to about 30 miles; then, in latitude 22° north, the boundary line between Egypt and the Sudan, it extends from the coast westward for fully 200 miles and, with occasional covers of sand, all the way to the Nile. The country to be explored is very great, but it has many advantages compared with its difficulties, one of the greatest of these being the invariable healthfulness of its climate.

ERITREA GOLD MINING.

[From the Statist, London, May 31, 1902.]

Capital has been put up jointly by English and Italian capitalists for exploiting northern Abyssinia for gold, and initial successes in finding reefs on the large area owned by the mining company that has been formed have fired the enthusiasm of Italian investors. The Società Eritrea per le Miniere d' Oro is the official title of the undertaking, which has an issued capital of £80,000, with power to increase to £320,000. Three blocks of land, having an aggregate of some 117 square miles, in the Asmara Plateau have been selected, and the prospecting work is represented to have shown on one portion of the property a wide reef formation. Test crushings, with a small 3-stamp Fraser & Chalmers prospecting battery, are reported to have given, on fairly large parcels of ore treated, from 9 pennyweights to as much as 2 ounces to the ton. Below 90 feet depth the reef became somewhat faulted, but at 130 feet depth the reef is represented as 15 feet wide, showing visible gold; and subsequently, at 200 feet down, 25 feet width, with assays of 12 pennyweights gold. Another working, 3 miles distant from the first, is represented to have shown a bold outcrop, with indications of there having been mining work by the ancients, the reef matter taken from the bottom of old workings giving 24 pennyweights over a width of $5\frac{1}{2}$ feet. Prospecting work is being continued. The company's areas are situated about 70 miles inland from the port of Massowah, and negotiations have been going on for the company to join in the construction of a railway to connect the mining district with the coast.

TRADE AND COMMERCE IN ABYSSINIA.

[From a report published in the Board of Trade Journal, London, April 3, 1902, by the United States consul-general at Marseilles.]

Europeans are interested in the reports of rich placer gold mines, and the following extracts from M. Le Roux's report with respect to gold discoveries may not be without interest:

"The Dejaz-Ghebregzyer said to me: 'Seek some brook in this region, and you find there many men who appear to be fishing, but in reality it is nuggets of gold that they seek.' I therefore asked to be taken to the nearest river, which happened to be the torrential stream of Karsa. At the first ford I found myself confronted by a native who was so occupied with his researches that I was able to take a photograph of him at his task. The proceeding is very simple:

The gold seeker enters the water with a sort of wooden basin. He stoops, buries his basin in the sand of the river, and then turns it at an angle, so that the water and sand seek the hollowed portion of the basin, which is steadily turned in such manner that the sand and earth are washed away and the heavier particles of gold rest in the lowest point of the basin, from which they are subsequently removed.

The gold seeker mounts slowly toward the head of the stream, plunging his basin into the earth every three or four steps, always repeating the operation. A more scientific method of proceeding has been adopted by a Frenchman, M. Camboul, who, in the remote portions of Abyssinia, where the placer streams are found, has erected a laboratory and carefully collected samples from all the different rocks in the vicinity. Thus far, however, nothing has been done as to developing this territory, except in the primitive manner heretofore described."

M. Le Roux himself satisfied his curiosity by digging in the shadow of one of the rocks brought to light by M. Camboul, and he describes a fragment of rock broken off by himself, which had the aspect of a piece of rusty iron. In fine parallel lines the points of gold were clearly visible. In another fragment of what is called "the rich yellow rock" the points of gold had the size of the head of a pin and were pressed together very closely. The rock itself had much the color of ivory.

The market for the gold-producing region of Abyssinia is at Nedjo. Gold washers bring the metal in dust and nuggets from all corners of the country, pressed into large quills closed with a morsel of wood. The holders are so transparent that the precious powder is as easily visible as though it were in a tube of glass. The washer sells the product to a broker, who works it into circles of pure gold of about the thickness of a heavy finger ring. These circles are not closed, so that the buyer may twist them before weighing, thus assuring himself, upon finding them malleable, that no copper has been mixed with the pure metal. These brokers sit bent over, in long files, with their small scales in their hands. Market rates vary from day to day. On April 13, 1901, 31 thalers silver were exchangeable for 1 thaler gold. This was the rate of exchange at which M. Le Roux's servants were able to transact business. But when he himself undertook to convert silver into gold, under the pretext that he was a foreigner and desired to weigh with his own scales, he was required to pay 33 thalers in place of 31

HAMMOND'S OPINION OF SOUTH AFRICA GOLD FIELDS.

[From Western Mining World, February 1, 1902.]

John Hays Hammond, the eminent mining engineer, says that the South African unpleasantness is an interlude in the Transvaal's mining history, a result of its mineral wealth, and probably a necessary evolution in its mining progress for the abolition of the old abuses.

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"The Rand is the world's richest storehouse of gold, all in what the West would call a little patch of ground 25 miles on either side of Johannesburg. It resembles anything but a mining district, having the appearance of a grazing country. The reefs are accessible and rather easily worked. The deposits are unique in their unparalleled persistence of ore, which is interspersed in the quartz and sandstone. It is not of very high quality, yielding about \$10 per ton. There are about 10,000 stamps in the district, which crush 7,000,000 tons a year. The war has blown over Johannesburg without doing any vital damage to the plants.

"Since its discovery in 1885 the Rand has yielded \$400,000,000 in gold, and just before the war it was yielding at the rate of \$100,000,000 a year, or one-third of the world's production, a rate which some years before, when the yield was but \$35,000,000 a year, I had predicted would come before the end of the century.

"Yet with all this richness there may be some disillusionment in the net generation. The reefs, it is true, are over a mile deep and the conditions favor deep mining. The increase in temperature is only 1 degree for 200 feet, so that we can mine down down 10,000 feet. The deposits, however, are not as asserted, practically unlimited. I believe that the future life of the Transvaal will not exceed thirty years, which means a yield of not much more than \$3,000,000,000. In eight or ten years after the peace the Rand will have reached its zenith.

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"In South Africa we compress centuries of mining history into decades, and we hold the world's records in mining for rapidity in exploitation, drilling, and hoisting. At Kimberly 2,000 tons have been hoisted up a 1,600-foot shaft in one day, while at the 'Simmer & Jack' we sent down a 22 by 20 shaft about 2,200 feet in one month.

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"There are many problems ahead of the Rand, the chief being that of power. There are no navigable rivers and practically no waterfalls. The Kaffir, of whom there are 100,000 in the Rand, is lazy and dissolute, and the war has made him worse and scarcer, while the climate makes white menial labor impossible. The Kaffir will work only long enough to buy a few wives to support him the rest of his days. If it can be done, he must be regenerated and his tribal organization disrupted. Then there are questions of improved mining processes and of further exploitation, as of the Randfontein, which I recommended in 1899.

"After the Rand is worked out there is little outside Kimberly worth fighting about. The only other gold deposits are those which were worked in Rhodesia in prehistoric times, and are supposed to be those of King Solomon and the Queen of Sheba, which yield about \$3,000,000 a year. The country can never support a large population, its resources above ground being meager. Coal and iron are scanty and inferior and copper deposits insignificant."

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SOUTH AFRICAN MINES.

["From our special mining commissioner" (The Economist, London, March 22, 1902).]

Lord Milner lately ventured the statement that before long there would be 5,000,000 white people in the Transvaal, the inference being that they were to be supported mainly by the mining industry.

If his lordship knew that country as well as I do he would realize that even in twenty years from now there will not be 5,000,000 whites in the whole of South Africa. The mistake of Lord Milner on a problem connected with gold mining in South Africa is typical of the far greater ignorance in the average lay mind on the same subject. I suppose that at the present moment there are really hundreds of thousands of people in Great Britain who believe that South Africa, and especially the Transvaal, is simply teeming with thousands of potential mines, which the narrowness and ignorance of the Boers caused to lie undeveloped, and which are about to be floated off by generous capitalists, and make rich everyone who is now shrewd enough to buy the shares.

As regards the already floated mines, they believe that, under an enlightened government, there is now going to be an all-round reduction of 5 to 6 shillings a ton in the cost of treating the ore, and that the dividends are going to be far higher than before. No wonder, seeing how widespread are these beliefs, that there has been a strong market in South Africans, and no wonder that the company promoters are now preparing some hundreds of quite worthless flotations for the acceptance of this gullible multitude.

In this paper, for the twelfth time, let me say that the Transvaal has been prospected over and over again from one end to the other, and that no payable patches of ore are known to exist which have not already been worked for years. When I first went to the Transvaal to mine, not only was the Rand an important field, but there was much activity at Heidelberg, Klerksdorp, De Kaap, Lydenburg, and all over the "low country." As the years passed by one mine after another in these outside districts closed down. When the war started there were, I suppose, not six outside mines working at a profit. And yet there had been hundreds of companies to commence with. There are hundreds of reefs all over the country—banket reefs, or any other variety you fancy—but they are no good. Not only are they unpayable, but no sophistry can make them anything else. They might get dynamite for nothing, and be relieved from all the other oppressions of the "corrupt oligarchy," and still they would be unpayable. And yet all these mines are going to be refloated

very soon, and puffed in the good, old-fashioned way, and the public is again going to lose heavily on them. This time I expect the losses will be greater than before.

The promoter floats with a bigger capital now, and will have a bigger public to sell to.

The mining industry was not in a languishing state before the war; it was working at full pressure. The rich mines then were making practically as big profits as they ever will, and the poor mines were doing just as well as poor mines do in any other country. Even on the Rand there are big stretches of ground that never have paid, and much of this ground can never be worked at a profit. Here and there one or two of these mines may earn small profits in the future, but there is no certainty that this will be so. Outside of the Rand the only payable mines I know of are Nigel, Nigel Deep, Sheba, Transvaal Mining Estates, and Glynn's. Sophists may talk till they are black in the face about the outside districts, but they will never make them payable. There are no new mines or new districts in the Transvaal.

There is the 40-mile stretch of the Witwatersrand (half of which is unpayable) and its deep levels, and there are the half dozen outside mines, just as there used to be. The investor or the ordinary speculator must not leave these areas, let the promoter rage ever so furiously; if he does, he simply throws away his money.

That, then, is the first step in a general survey of South African mines. The hazy idea that has grown up of vast potentialities, of rich mines and districts now to be brought to light for the first time, is all nonsense. Company promoters and the subsidized press—in their ramifications they resemble the tentacles of a loathsome octopus—are trying all they can to instill this idea. They will assuredly do an immense amount of harm in the next year or two, but I believe there are still a few sane and honest people in England who will not be led away. Again, let me say this: There is the Rand, where all the good ground is already taken up, and where nearly all the shares are already overvalued, and there are the one or two small outside patches. But outside of these definite areas there are going to be floated in the next year or two hundreds—perhaps even a thousand—of quite worthless mines. In these the British public is going to lose millions of hard cash. Let every reader of this mentally register a vow that he will not be found among that great band.

LIVES OF MINES.

[From *The Statist*, London, May 31, 1902.]

In no known gold-producing district of the world, until proofs by developments in the Witwatersrandt occurred, was there any degree of certainty or assurance in calculating the life of a gold mine. But on the Randt the nature of the formation is such that a fair reliance can be placed upon calculation as to "life." The banket formation, as it is called, along the Randt continues its course with a remarkable degree of regularity; and given the data of the thickness of reef series, the dip of the reefs into the ground, and the extent of the ground itself as to surface, calculations can pretty readily be made as to how long the area below the given area of surface will last a mill of defined dimensions. Generally, the experience on the Randt has been that the calculations have been under the mark. This was distinctly the case in respect of the Stanhope and Pioneer mines, and evidently is likely to be the case with a good many other properties of larger dimensions.

In some quarters we have heard it asserted that the more liberal sorting that is generally being conducted on the Randt may mean a reduction in the lives of some of the important mining properties. There is one initial error in this idea. In days not long ago underground work was done entirely by hand. The drilling of the rock was effected by a long steel chisel, hammered into the rock or reef by natives. Charges of dynamite were placed into the holes that were so made, and under white supervision only a small quantity of nonauriferous country rock was blown out along with the reef matter that had to be extracted. Then came the day of the rock drill, with rapidity and economy in its use. But with the rock drills a far greater quantity of the barren rock is extracted with the reef matter than previously has been the ease with hand labor. A little consideration will clearly indicate that to put worthless rock through the mill with gold-bearing reef is waste; hence when the stuff is raised to the surface, companies now adopt the procedure of depositing on revolving circular tables the rock and reef obtained from the mine.

This, when wetted, easily enables the natives to pick out the rock and throw it on one side. The reef alone, as the table revolves, is carried away, the coarse pieces of true reef are broken up, and with the fine stuff all to be used is passed through the mill.

To revert, however, to consideration of the data for forming estimates of life, we notice from recent utterances at meetings held at Johannesburg some important statements. Naturally, in working out an estimate as to the life of a mine, one has

to rely upon what is officially made known as to stoping width and the other main particulars bearing on the subject. In three special cases of deep-level companies which held their meetings on the same day in April—the Geldenhuis Deep, the Crown Deep, and the Rose Deep—most important announcements bearing on the question of life were made, the chairman in each case mentioning that, on conservative lines, the ore reserves in the past had been based upon a much thinner stoping width than actually was being extracted. In the case of the Rose Deep, the chairman observed that they had formerly estimated on an average stoping width of 8 feet, taken throughout the mine; but they had, consequent on actual observations and work done, decided to increase the basis of calculation to an average of 13 feet, “which,” the chairman added, “I must say still appears to me to be very conservative.”

The importance of the utterances respecting the modification of method of estimating ore reserves can be gauged if we take a typical example. The only figures mentioned in the addresses to the shareholders above referred to were in respect of the Rose Deep, whose chairman represented that the former style of estimating reserves was based on a thickness of 8 feet of reefs worked. In his official report to the board the general manager, in accounting for a great increase in the amount of ore developed, said that he now based his calculations upon a thickness of 13 feet extraction of reefs (Rose Deep). In our work, Mines of the Transvaal, when estimating the life of the Rose Deep, we deemed it within the mark to calculate upon a gross mining quantity of 9 feet thickness of reefs; then from that we deducted 25 per cent, a rough-and-ready calculation, as allowance for sorting, faults, etc. On these bases, with 200 stamps dealing with 350,000 tons a year, we calculated the life of the mine would be some twenty-two years. Under the new conditions, if they extend to the whole of the mine for the future, the life will be very greatly extended. Thus, assuming a dip of 29°, and one claim 1 foot thickness showing, say, 6,700 tons—

	Tons per claim.
12 feet would give	80, 400
Less 25 per cent	20, 100
Mill tons per claim	60, 300
Say 60,000 net mill tons \times 181 claims	10, 860, 000
Less worked out to end 1901, say	860, 000
Remaining January 1, 1902, say	10, 000, 000

Such quantity would admit of the running of a mill of 200 stamps for nearly thirty years. Similarly, in respect of Geldenhuis Deep, if 10 feet of reefs be taken in lieu of the estimate, formerly considered reasonable, of 6 feet as available net for the mill, it would extend the life from the former idea of about twenty-two years to over thirty years.

PART III.

GENERAL STATISTICS.

I.—DEPOSITS AND PURCHASES OF GOLD AND SILVER, BY WEIGHT,

Description of deposits.	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Orleans.	New York.	Denver.
GOLD.					
	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>
Domestic bullion, unrefined ...	12,759.891	221,416.547	166.640	392,008.813	213,084.681
Domestic bullion, refinery bars				307,462.172	550,513.632
Domestic bullion, refined		1,478,157.797		1,343,715.432	102,762.139
Total domestic bullion...	12,759.891	1,699,574.344	166.640	2,043,186.417	866,360.452
Domestic coin, mutilated and abraded	5,566.188	113.818	447.903	31,332.221	6.610
Domestic coin, Treasury trans- fers	43,727.020				
Foreign bullion, unrefined ...	6,947.438	27,049.815	16,593.695	249,553.637	69.890
Foreign bullion, refined abroad		42,557.243		11,289.171	
Foreign coin	1,571.753	824,207.154	1,197.360	167,680.159	
Jewelers' bars, old plate, etc...	49,676.745	1,491.995	3,113.017	164,286.513	1,428.313
Total deposits	120,249.035	2,594,994.369	21,518.615	2,670,328.118	867,865.265
Redeposits:					
Fine bars	109,364.556			12,955.438	
Unparted bars	1,014,088.148	828,468.044			33.420
Total redeposits	1,123,452.704	828,468.044		12,955.438	33.420
Total gold operated upon	1,243,701.739	3,423,462.413	21,518.615	2,683,283.556	867,898.685
SILVER.					
Domestic bullion, unrefined ...	8,684.28	46,639.50	51.95	254,202.35	73,827.74
Domestic bullion, refinery bars				74,463.80	3,979.96
Domestic bullion, refined				1,269,508.36	
Total domestic bullion...	8,684.28	46,639.50	51.95	1,598,174.51	77,807.70
Domestic coin, mutilated and abraded	2,616.07	152.70	474.04		
Domestic coin, Treasury trans- fers	1,711,529.29	160,223.72	744,032.10		
Trade dollars	226.20		1.72		
Foreign bullion, unrefined ...	20,645.79	44,478.17	3,850.29	1,077,998.62	86.39
Foreign bullion, refined abroad					
Foreign coin	310.01		.07	90,312.25	
Jewelers' bars, old plate, etc...	105,327.35	15,180.30	3,717.20	471,082.29	424.29
Total deposits	1,849,338.99	266,674.39	752,127.37	3,237,567.67	78,318.38
Redeposits:					
Fine bars		1,541,861.71	13,312,135.54	26,516.09	
Mint bats	203,006.67				
Standard bars			282,193.67	1,719.91	
Unparted bars	151,059.68	173,477.62			11.86
Total redeposits	354,066.35	1,715,339.33	13,594,329.21	28,236.00	11.86
Total silver operated upon	2,203,405.34	1,982,013.72	14,346,456.58	3,265,803.67	78,330.24

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1901.

ASSAY OFFICES.							Total.
Carson City.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.	
<i>Stand. ozs.</i> 17,904.393	<i>Stand. ozs.</i> 95,371.247	<i>Stand. ozs.</i> 90,532.577	<i>Stand. ozs.</i> 8,666.614 3,806.504	<i>Stand. ozs.</i> 96.780 1,628.338 264.616	<i>Stand. ozs.</i> 23,418.785	<i>Stand. ozs.</i> 129,761.649 1,976.540 74,816.024	<i>Stand. ozs.</i> 1,205,188.617 865,387.186 2,999,716.008
17,904.393	95,371.247	90,532.577	12,473.118	1,989.734	23,418.785	206,554.213	5,070,291.811
			4.109	37.927		5.854	40,514.630
							43,727.020
	113.905	25,488.877		62.812		604,670.854	930,550.923
			3.057			198.439	53,846.414
5.058		109.594	168.316	1,804.271		255.478	994,857.922
							222,339.300
17,909.451	95,485.152	116,131.048	12,648.600	3,894.744	23,418.785	811,684.838	7,356,128.020
		468.129				14.258	122,319.994
							1,843,071.999
		468.129				14.258	1,965,391.993
17,909.451	95,485.152	116,599.177	12,648.600	3,894.744	23,418.785	811,699.096	9,321,520.013
10,460.78	29,381.99	23,545.83	624.47	6.78 5.35	7,315.77	16,974.42	471,715.86
							78,449.11
							1,269,508.36
10,460.78	29,381.99	23,545.83	624.47	12.13	7,315.77	16,974.42	1,819,673.33
			6.38				3,249.19
							2,615,785.11
	32.71	15,201.57		16.63		145,237.53	227.92
							1,307,547.70
			1.25			.35	90,623.93
1.25		26.27	142.06	452.43		72.71	596,426.15
10,462.03	29,414.70	38,773.67	774.16	481.19	7,315.77	162,285.01	6,433,533.33
							14,880,513.34
							203,006.67
		328.35				4.42	283,913.58
							324,881.93
		328.35				4.42	15,692,315.52
10,462.03	29,414.70	39,102.02	774.16	481.19	7,315.77	162,289.43	22,125,848.85

II.—DEPOSITS AND PURCHASES OF GOLD AND SILVER, BY VALUE,

Description of deposits.	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Orleans.	New York.	Denver.
GOLD.					
Domestic bullion, unrefined...	\$237, 393. 31	\$4, 119, 377. 62	\$3, 100. 27	\$7, 293, 187. 22	\$3, 964, 366. 16
Domestic bullion, refinery bars.....	.....	.....	.....	5, 720, 226. 45	10, 242, 114. 07
Domestic bullion, refined.....	.....	27, 500, 610. 17	.....	24, 999, 356. 88	1, 911, 853. 75
Total domestic bullion...	237, 393. 31	31, 619, 987. 79	3, 100. 27	38, 012, 770. 55	16, 118, 333. 98
Domestic coin, mutilated and abraded.....	103, 557. 01	2, 117. 54	8, 333. 07	638, 739. 01	122. 99
Domestic coin, Treasury trans- fers.....	813, 525. 95	.....	.....	.....	.....
Foreign bullion, unrefined.....	129, 254. 66	503, 252. 37	308, 719. 90	4, 642, 858. 36	1, 300. 28
Foreign bullion, refined abroad.....	.....	791, 762. 66	.....	210, 031. 08	.....
Foreign coin.....	29, 241. 91	15, 334, 086. 59	22, 276. 38	3, 119, 630. 86	.....
Jewelers' bars, old plate, etc...	924, 218. 51	27, 758. 05	57, 916. 59	3, 056, 493. 27	26, 573. 26
Total deposits.....	2, 237, 191. 35	48, 278, 965. 00	400, 346. 21	49, 680, 523. 13	16, 146, 330. 51
Redeposits:	.....	.....	.....	.....	.....
Fine bars.....	2, 034, 689. 41	.....	.....	241, 031. 41	.....
Unparted bars.....	18, 866, 756. 24	15, 413, 358. 95	.....	.....	621. 77
Total redeposits.....	20, 901, 445. 65	15, 413, 358. 95	.....	241, 031. 41	621. 77
Total gold operated upon.....	23, 138, 637. 00	63, 692, 323. 95	400, 346. 21	49, 921, 554. 54	16, 146, 952. 28
SILVER.					
Domestic bullion, unrefined...	10, 105. 34	54, 271. 42	60. 45	295, 799. 10	85, 908. 64
Domestic bullion, refinery bars.....	.....	.....	.....	86, 648. 78	4, 631. 22
Domestic bullion, refined.....	.....	.....	.....	1, 477, 246. 10	.....
Total domestic bullion...	10, 105. 34	54, 271. 42	60. 45	1, 859, 693. 98	90, 539. 86
Domestic coin, mutilated and abraded.....	3, 044. 16	177. 69	551. 61	.....	.....
Domestic coin, Treasury trans- fers.....	1, 991, 597. 71	186, 442. 15	865, 782. 81	.....	.....
Trade dollars.....	263. 22	.....	2. 00	.....	.....
Foreign bullion, unrefined.....	24, 024. 19	51, 756. 41	4, 480. 33	1, 254, 398. 39	100. 53
Foreign bullion, refined abroad.....	.....	.....	.....	.....	.....
Foreign coin.....	360. 74	.....	. 08	105, 090. 62	.....
Jewelers' bars, old plates, etc ..	122, 562. 74	17, 664. 35	4, 325. 47	548, 168. 48	493. 72
Total deposits.....	2, 151, 958. 10	310, 312. 02	875, 202. 75	3, 767, 351. 47	91, 131. 11
Redeposits:	.....	.....	.....	.....	.....
Fine bars.....	.....	1, 794, 166. 35	15, 490, 484. 99	30, 855. 09	.....
Mint bars.....	236, 225. 94	.....	.....	.....	.....
Standard bars.....	.....	.....	328, 370. 82	2, 001. 35	.....
Unparted bars.....	175, 778. 54	201, 864. 87	.....	.....	13. 80
Total redeposits.....	412, 004. 48	1, 996, 031. 22	15, 818, 855. 81	32, 856. 44	13. 80
Total silver operated upon.....	2, 563, 962. 58	2, 306, 343. 24	16, 694, 058. 56	3, 800, 207. 91	91, 147. 91

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1901.

ASSAY OFFICES.							Total.
Carson City.	Boise.	Helena.	Charlotte.	St. Louis.	Dead-wood.	Seattle.	
\$333,104.95	\$1,774,344.62	\$1,684,326.06	\$161,238.77	\$1,800.55	\$435,697.89	\$2,414,170.21	\$22,422,107.63
.....	.....	.....	70,818.67	30,294.65	.....	36,772.84	16,100,226.68
.....	.....	.....	.....	4,923.08	.....	1,391,926.03	55,808,669.91
333,104.95	1,774,344.62	1,684,326.06	232,057.44	37,018.28	435,697.89	3,842,869.08	94,331,004.22
.....	.....	.....	76.45	704.61	.....	108.91	753,759.59
.....	.....	.....	.....	.....	.....	.....	813,525.95
.....	2,119.16	474,211.61	.....	1,168.60	.....	11,249,687.94	17,312,572.88
.....	.....	.....	56.87	.....	.....	3,691.89	1,001,793.74
94.10	.....	2,038.96	3,131.46	33,567.83	.....	4,753.08	18,508,984.50
.....	.....	.....	.....	.....	.....	.....	4,136,545.11
333,199.05	1,776,463.78	2,160,576.63	235,322.22	72,459.32	435,697.89	15,101,110.90	136,858,185.99
.....
.....	.....	8,709.38	.....	.....	.....	265.27	2,275,720.82
.....	.....	.....	.....	.....	.....	.....	34,289,711.61
.....	.....	8,709.38	.....	.....	.....	265.27	36,565,432.43
333,199.05	1,776,463.78	2,169,286.01	235,322.22	72,459.32	435,697.89	15,101,376.17	173,423,618.42
.....
12,172.27	34,189.95	27,398.78	726.66	7.89	8,512.89	19,752.05	548,905.44
.....	.....	.....	.....	6.22	.....	.....	91,286.22
.....	.....	.....	.....	.....	.....	.....	1,477,246.10
12,172.27	34,189.95	27,398.78	726.66	14.11	8,512.89	19,752.05	2,117,437.76
.....	.....	.....	7.42	.....	.....	.....	3,780.88
.....	.....	.....	.....	.....	.....	.....	3,043,822.67
.....	38.06	17,689.10	.....	19.35	.....	169,003.66	265.22
.....	.....	.....	.....	.....	.....	.....	1,521,510.02
.....	.....	.....	1.45	.....	.....	.41	105,453.30
1.45	.....	30.57	165.31	526.47	.....	84.61	694,023.17
.....
12,173.72	34,228.01	45,118.45	900.84	559.93	8,512.89	188,840.73	7,486,293.02
.....
.....	.....	.....	.....	.....	.....	.....	17,315,506.43
.....	.....	.....	.....	.....	.....	.....	236,225.94
.....	.....	382.08	.....	.....	.....	5.14	330,372.17
.....	.....	.....	.....	.....	.....	.....	378,044.43
.....	.....	382.08	.....	.....	.....	5.14	18,260,148.97
.....
12,173.72	34,228.01	45,500.53	900.84	559.93	8,512.89	188,845.87	25,746,441.99

III.—DEPOSITS OF UNREFINED GOLD OF DOMESTIC PRODUCTION, WITH THE STATES AND AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC BULLION NOT

	Source.	COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
		Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.
1	Alabama			124.224		
2	Alaska	1, 117.525	10, 188.576	12.868	191.445	143.469
3	Arizona	45.756	27, 800.281	18.776	293.157	19, 950.846
4	California	105.859	166, 327.792		3, 593.063	148.763
5	Colorado	120.464	390.789		552.672	180, 233.627
6	Georgia.....	1, 209.332		10.772	32.707	
7	Idaho	365.088	508.894		65.965	113.514
8	Indiana	13.441				
9	Michigan.....	.137			7.105	
10	Montana	7, 150.058	57.304		28, 587.295	41.783
11	Nevada	719.750	4, 169.979		34, 089.544	8.705
12	New Mexico.....	1.584	41.080		930.918	8, 593.558
13	North Carolina	343.328			349.644	
14	Oregon	850.697	8, 772.759			61.052
15	South Carolina	2.000				
16	South Dakota	305.667			228, 174.694	445.623
17	Texas					
18	Utah		815.121		78, 736.988	2, 725.991
19	Virginia	276.338			5.404	
20	Washington	90.157	2, 326.088		16, 398.212	28.833
21	Wyoming.....	16.280				588.917
22	Other.....	26.430	17.884			
	Total unrefined	12, 759.891	221, 416.547	166.640	392, 008.813	213, 084.681
	Refinery bars (fineness below 0.992)				307, 462.172	550, 513.632
	Refined bullion (fineness 0.992 and over)		1, 478, 157.797		1, 343, 715.432	102, 762.139
	Total gold	12, 759.891	1, 690, 574.344	166.640	2, 043, 186.417	866, 360.452

IV.—DEPOSITS OF UNREFINED GOLD OF DOMESTIC PRODUCTION, WITH THE STATES AND AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC BULLION NOT

	Source.	COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
1	Alabama			\$2, 311.14		
2	Alaska	\$20, 791.16	\$189, 554.90	239.40	\$3, 561.77	\$2, 669.19
3	Arizona	851.27	517, 214.53	349.32	5, 454.08	371, 178.53
4	California	1, 969.47	3, 094, 470.55		66, 847.68	2, 767.68
5	Colorado	2, 241.19	7, 270.49		10, 282.27	3, 353, 183.76
6	Georgia.....	22, 499.20		200.41	608.50	
7	Idaho	6, 792.33	9, 467.80		1, 227.26	2, 111.89
8	Indiana	250.07				
9	Michigan.....	2.55			132.19	
10	Montana	133, 024.33	1, 066.12		531, 856.65	777.36
11	Nevada	13, 390.70	77, 581.00		634, 224.08	161.96
12	New Mexico.....	29.47	764.28		17, 319.40	159, 880.15
13	North Carolina	6, 387.50			6, 505.00	
14	Oregon	15, 826.92	163, 214.12			1, 135.85
15	South Carolina	37.21				
16	South Dakota	5, 686.83			4, 245, 110.59	8, 290.66
17	Texas					
18	Utah		15, 165.04		1, 464, 874.20	50, 716.11
19	Virginia	5, 141.17			100.54	
20	Washington	1, 677.34	43, 276.06		305, 083.01	536.43
21	Wyoming.....	302.88				10, 956.59
22	Other.....	491.72	332.73			
	Total unrefined	237, 393.31	4, 119, 377.62	3, 100.27	7, 293, 187.22	3, 964, 366.16
	Refinery bars (fineness below 0.992)				5, 720, 226.45	10, 242, 114.07
	Refined bullion (fineness 0.992 and over)		27, 500, 610.17		24, 999, 356.88	1, 911, 853.75
	Total gold	237, 393.31	31, 619, 987.79	3, 100.27	38, 012, 770.55	16, 118, 333.98

TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINED BARS (FINENESS BELOW 0.992) DISTRIBUTED, BY WEIGHT, DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1901.

ASSAY OFFICES.							Total.	
Carson City.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	
			40.987				165.211	1
		491.338		9.280		126,427.659	138,582.160	2
							48,108.816	3
1,810.268							171,985.745	4
						8.953	181,306.505	5
		23.463	5,268.825	7.420			6,552.519	6
	39,622.150	7,429.378				300.279	48,405.268	7
							13.441	8
							7.242	9
	7,615.041	80,814.773				5.818	124,272.072	10
16,094.125							55,082.103	11
			1.449	70.202			9,638.791	12
			845.986				1,538.958	13
	47,326.507	105.734				260.101	57,376.850	14
			2,508.889				2,510.889	15
					23,418.785		252,344.769	16
				9.878			9.878	17
	589.938						82,868.038	18
			.478				282.220	19
	217.611	1,652.845				2,758.839	23,472.585	20
		15.046					620.243	21
							44.314	22
17,904.393	95,371.247	90,532.577	8,666.614	96.780	23,418.785	129,761.649	1,205,188.617	
			3,806.504	1,628.338		1,976.540	865,387.186	
				264.616		74,816.024	2,999,716.008	
17,904.393	95,371.247	90,532.577	12,473.118	1,989.734	23,418.785	206,554.213	5,070,291.811	

TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINED BARS (FINENESS BELOW 0.992) DISTRIBUTED, BY VALUE, DURING CALENDAR YEAR ENDED DECEMBER 31, 1901.

ASSAY OFFICES.							Total.	
Carson City.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
			\$762.54				\$3,073.68	1
		\$9,141.16		\$172.65		\$2,352,142.50	2,578,272.73	2
\$33,679.39							895,047.73	3
							3,199,734.77	4
		436.52	98,024.38	138.04		166.56	3,373,144.27	5
	\$737,154.78	138,220.90				5,586.59	121,907.05	6
							900,561.55	7
							250.07	8
	141,674.43	1,503,529.85				108.24	134.74	9
299,425.56							2,312,036.98	10
			26.96	1,306.08			1,024,783.30	11
			15,739.27				179,326.34	12
	880,491.64	1,967.14				4,839.09	28,631.77	13
			46,676.73				1,067,474.76	14
					\$435,697.89		46,713.94	15
				183.78			4,694,785.97	16
	10,975.35						183.78	17
			8.89				1,541,730.70	18
	4,048.42	30,750.57				51,327.23	5,250.60	19
		279.92					436,699.06	20
							11,539.39	21
							824.45	22
333,104.95	1,774,344.62	1,684,326.06	161,238.77	1,800.55	435,697.89	2,414,170.21	22,422,107.63	
			70,818.67	30,294.65		36,772.84	16,100,226.68	
				4,923.08		1,391,926.03	55,808,669.91	
333,104.95	1,774,344.62	1,684,326.06	232,057.44	37,018.28	435,697.89	3,842,869.08	94,331,004.22	

V.—DEPOSITS OF UNREFINED SILVER OF DOMESTIC PRODUCTION, WITH THE STATES AND AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC BULLION NOT

Source.		COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
		<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>
1	Alabama			42.59		
2	Alaska	244.16	1,168.75	2.42	32.19	36.92
3	Arizona	6.97	9,234.01	4.87	100.85	12,399.95
4	California	32.96	30,720.61		684.61	59.88
5	Colorado	25.71	143.72		1,123.77	59,077.82
6	Georgia	184.26		2.07	2.25	
7	Idaho	85.41	109.41		18.94	8.54
8	Indiana	1.12				
9	Michigan	2,759.12			31,191.49	
10	Montana	3,547.93	3.14		27,579.44	6.21
11	Nevada	154.51	2,310.47		39,942.15	2.34
12	New Mexico	1,044.15	9.79		33,512.64	1,653.45
13	North Carolina	69.88			131.73	
14	Oregon	156.10	2,200.41			14.63
15	South Carolina					
16	South Dakota	252.95			64,819.92	58.61
17	Texas					
18	Utah		475.34		46,679.08	459.53
19	Virginia	67.82			2.34	
20	Washington	42.57	256.81		8,380.95	6.57
21	Wyoming	2.23				43.29
22	Other.....	6.43	7.04			
	Total unrefined	8,684.28	46,639.50	51.95	254,202.35	73,827.74
	Refinery bars (fineness below 0.992)				74,463.80	3,979.96
	Refined bullion (fineness 0.992 and over)				1,269,508.36	
	Total silver.....	8,684.28	46,639.50	51.95	1,598,174.51	77,807.70

VI.—DEPOSITS OF UNREFINED SILVER OF DOMESTIC PRODUCTION, WITH THE STATES AND AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC BULLION NOT

Source.		COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
1	Alabama			\$49.56		
2	Alaska	\$284.11	\$1,360.00	2.82	\$37.46	\$42.96
3	Arizona	8.11	10,745.03	5.67	117.35	14,429.03
4	California	38.35	35,747.62		796.64	69.68
5	Colorado	29.92	167.24		1,307.66	68,745.09
6	Georgia	214.41		2.40	2.62	
7	Idaho	99.39	127.31		22.04	9.94
8	Indiana	1.30				
9	Michigan	3,210.61			36,295.55	
10	Montana	4,128.50	3.65		32,092.44	7.23
11	Nevada	179.79	2,688.55		46,478.14	2.73
12	New Mexico	1,215.01	11.39		38,996.53	1,924.01
13	North Carolina	81.32			153.28	
14	Oregon	181.64	2,560.48			17.02
15	South Carolina					
16	South Dakota	294.34			75,426.82	68.20
17	Texas					
18	Utah		553.12		54,317.47	534.73
19	Virginia	78.92			2.72	
20	Washington	49.54	298.84		9,752.38	7.64
21	Wyoming	2.60				50.38
22	Other.....	7.48	8.19			
	Total unrefined	10,105.34	54,271.42	60.45	295,799.10	85,908.64
	Refinery bars (fineness below 0.992)				86,648.78	4,631.22
	Refined bullion (fineness 0.992 and over)				1,477,246.10	
	Total silver.....	10,105.34	54,271.42	60.45	1,859,693.98	90,539.86

TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINED BARS (FINENESS BELOW 0.992) DISTRIBUTED, BY WEIGHT, DURING THE CALENDAR YEAR ENDED DECEMBER, 31, 1901.

ASSAY OFFICES.							Total.	
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.	Stand. ozs.	
Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	
			1.19				43.78	1
		56.63		1.26		15,829.91	17,372.24	2
							21,746.65	3
939.09							32,437.15	4
						.90	60,371.92	5
		1.44	265.57	.23			455.82	6
	12,177.71	1,746.54				72.41	14,218.96	7
							1.12	8
							33,950.61	9
	780.75	21,225.23				.89	53,143.59	10
9,521.69			.89	4.40			51,931.16	11
			140.46				36,225.32	12
	16,250.52	29.37				56.31	342.07	13
			216.30				18,707.34	14
					7,315.77		216.30	15
				.89			72,447.25	16
	132.83						.89	17
			.06				47,746.78	18
	40.18	485.24				1,014.00	70.22	19
		1.38					10,226.32	20
							46.90	21
							13.47	22
10,460.78	29,381.99	23,545.83	624.47	6.78	7,315.77	16,974.42	471,715.86	
				5.35			78,449.11	
							1,269,508.36	
10,460.78	29,381.99	23,545.83	624.47	12.13	7,315.77	16,974.42	1,819,673.33	

TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINED BARS (FINENESS BELOW 0.992) DISTRIBUTED, BY VALUE, DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1901.

ASSAY OFFICES.							Total.	
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
			\$1.39				\$50.95	1
		\$65.90		\$1.46		\$18,420.26	20,214.97	2
							25,305.19	3
\$1,092.74							37,745.03	4
		1.67	309.03	.27		1.05	70,250.96	5
	\$14,170.42	2,032.34					530.40	6
						84.26	16,545.70	7
							1.30	8
	908.51	24,698.45					39,506.16	9
11,079.53						1.03	61,839.81	10
			1.04	5.12			60,428.74	11
			163.44				42,153.10	12
	18,909.70	34.18					398.04	13
			251.69			65.52	21,768.54	14
					\$8,512.89		251.69	15
				1.04			84,302.25	16
	154.57						1.04	17
			.07				55,559.89	18
	46.75	564.64					81.71	19
		1.60				1,179.93	11,899.72	20
							54.58	21
							15.67	22
12,172.27	34,189.95	27,398.78	726.66	7.89	8,512.89	19,752.05	548,905.44	
				6.22			91,286.22	
							1,477,246.10	
12,172.27	34,189.95	27,398.78	726.66	14.11	8,512.89	19,752.05	2,117,437.76	

VII.—BARS MANUFACTURED OF GOLD AND SILVER, BY WEIGHT,

Description.	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Or- leans.	Carson.	New York.
GOLD.	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>
Fine bars	163,354.163	51.949	454.029	.....	2,424,600.668
Mint bars .....	.....	.....	.....	.....	220,048.920
Standard bars.....	.....	.....	.....	.....	15,475.510
Unparted bars	17.639	.....	.....	17,909.451	.....
Total gold.....	163,371.802	51.949	454.029	17,909.451	2,660,125.098
SILVER.					
Fine bars	116,654.37	56,642.64	2,583.39	.....	2,929,028.58
Mint bars .....	.....	.....	.....	.....	319,058.26
Standard bars.....	.....	.....	.....	.....	7,245.85
Unparted bars .....	.31	.....	.....	10,462.03	.....
Total silver	116,654.68	56,642.64	2,583.39	10,462.03	3,255,332.69

VIII.—BARS MANUFACTURED OF GOLD AND SILVER, BY VALUE,

Description.	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Or- leans.	Carson.	New York.
GOLD.					
Fine bars	\$3,039,147.22	\$966.49	\$8,447.06	.....	\$45,108,849.64
Mint bars .....	.....	.....	.....	.....	4,093,933.39
Standard bars.....	.....	.....	.....	.....	287,916.47
Unparted bars	328.18	.....	.....	\$333,199.05	.....
Total gold.....	3,039,475.40	966.49	8,447.06	333,199.05	49,490,699.50
SILVER.					
Fine bars	135,743.26	65,911.44	3,006.13	.....	3,408,324.17
Mint bars .....	.....	.....	.....	.....	371,267.79
Standard bars.....	.....	.....	.....	.....	8,431.53
Unparted bars .....	.36	.....	.....	12,173.72	.....
Total silver	135,743.62	65,911.44	3,006.13	12,173.72	3,788,023.49
Total gold and silver	3,175,219.02	66,877.93	11,453.19	345,372.77	53,278,722.99

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1901.

ASSAY OFFICES.							Total.
Denver.	Boise.	Helena.	Charlotte.	St. Louis.	Dead-wood.	Seattle.	
<i>Stand. ozs.</i> 102,762.139	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i> 76,792.564	<i>Stand. ozs.</i> 2,768,015.512
765,103.126	95,485.152	116,131.048	12,648.600	3,894.744	23,418.785	734,892.274	220,048.920
867,865.265	95,485.152	116,131.048	12,648.600	3,894.744	23,418.785	811,684.838	15,475.510
							1,769,500.819
							4,773,040.761
							3,104,908.98
							319,058.26
							7,245.85
78,318.38	29,414.70	38,773.67	774.16	481.19	7,315.77	162,285.01	327,825.22
78,318.38	29,414.70	38,773.67	774.16	481.19	7,315.77	162,285.01	3,759,038.31

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1901.

ASSAY OFFICES.							Total.
Denver.	Boise.	Helena.	Charlotte.	St. Louis.	Dead-wood.	Seattle.	
\$1,911,853.75						\$1,428,698.87	\$51,497,963.03
							4,093,933.39
14,234,476.75	\$1,776,463.78	\$2,160,576.63	\$235,322.22	\$72,459.32	\$435,697.89	13,672,412.03	287,916.47
16,146,330.50	1,776,463.78	2,160,576.63	235,322.22	72,459.32	435,697.89	15,101,110.90	32,920,935.85
							88,800,748.74
							3,612,985.00
							371,267.79
91,134.11	34,228.01	45,118.45	900.84	559.93	8,512.89	188,840.73	8,431.53
91,134.11	34,228.01	45,118.45	900.84	559.93	8,512.89	188,840.73	381,469.04
16,237,464.61	1,810,691.79	2,205,695.08	236,223.06	73,019.25	444,210.78	15,289,951.63	4,374,153.36
							93,174,902.10

**IX.—MUTILATED AND UNCURRENT DOMESTIC GOLD AND SILVER COINS TRANSFERRED
THE CALENDAR YEAR ENDED**

Denomination.	PHILADELPHIA.		SAN FRANCISCO.		NEW ORLEANS.	
	Received from Treasury.	Purchased.	Received from Treasury.	Purchased.	Received from Treasury.	Purchased.
GOLD.						
Double eagles	\$262,980.00	\$32,420.00	.....	\$1,300.00	.....	\$5,340.00
Eagles.....	176,320.00	29,850.00	.....	290.00	.....	1,540.00
Half eagles.....	370,240.00	36,235.00	.....	695.00	.....	1,430.00
Three-dollar pieces....	39.00	45.00	.....	6.00	.....	.....
Quarter eagles.....	10,577.50	5,650.00	.....	107.50	.....	77.50
Dollars	114.00	210.00	.....	29.00	.....	49.00
Total gold, face value	820,270.50	104,410.00	.....	2,427.50	.....	8,436.50
SILVER.						
Trade dollars.....	.....	260.00	.....	.....	.....	2.00
Standard dollars .....	.....	1,260.00	.....	33.00	.....	397.00
Half dollars	908,292.00	968.00	\$107,000.00	59.50	\$526,120.00	66.00
Quarter dollars.....	761,946.75	694.50	61,000.00	17.00	311,674.50	52.25
Twenty-cent pieces....	124.20	.....	6.20	.....	64.00	1.20
Dimes	584,857.00	285.00	43,000.00	90.00	147,491.10	60.90
Half dimes	1,076.85	30.60	208.70	.20	329.20	4.25
Three-cent pieces	38.25	1.32	.....	.....	1.20	.....
Total silver, face value	2,256,335.05	3,499.42	211,214.90	199.70	985,680.00	583.60
SUMMARY.						
	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>
Gold coins.....	43,727.020	5,566.188	.....	113.818	.....	447.903
Silver coins.....	1,711,529.29	2,842.27	160,223.72	152.70	744,032.10	475.76
Gold, coining value ...	\$813,525.95	\$103,557.01	.....	\$2,117.54	.....	\$8,333.07
Silver, subsidiary value	2,129,429.90	3,536.26	\$199,345.20	189.98	\$925,700.88	591.92
Loss, gold	6,744.55	852.99	.....	309.96	.....	103.43
Loss, silver, subsidiary	126,905.15	.....	11,869.70	9.72	59,979.12	.....
Gain, silver, subsidiary	.....	36.84	.....	.....	.....	8.32

FROM THE TREASURY AND PURCHASED OVER THE COUNTER FOR RECOINAGE DURING DECEMBER 31, 1901.

NEW YORK.	DENVER.	CHARLOTTE.	ST. LOUIS.	SEATTLE.	TOTAL.		
Purchased.	Purchased.	Purchased.	Purchased.	Pur- chased.	Received from Treasury.	Purchased.	Received from Treas- ury and purchased.
\$179,760.00	\$40.00	.....	\$240.00	\$40.00	\$262,980.00	\$219,140.00	\$482,120.00
304,540.00	40.00	\$30.00	140.00	10.00	176,320.00	336,440.00	512,760.00
150,205.00	35.00	40.00	330.00	55.00	370,240.00	189,025.00	559,265.00
36.00	3.00	.....	.....	.....	39.00	90.00	129.00
10,272.50	5.00	5.00	25.00	5.00	10,577.50	16,147.50	26,725.00
45.00	2.00	7.00	.....	2.00	114.00	544.00	458.00
644,858.50	125.00	82.00	735.00	112.00	820,270.50	761,186.50	1,581,457.00
.....	.....	.....	.....	.....	.....	262.00	262.00
.....	.....	4.00	.....	.....	.....	1,694.00	1,694.00
.....	.....	.....	.....	.....	1,541,412.00	1,093.50	1,542,505.50
.....	.....	3.75	.....	.....	1,134,621.25	767.50	1,135,388.75
.....	.....	.....	.....	.....	194.40	1.20	195.60
.....	.....	1.00	.....	.....	775,348.10	436.90	775,785.00
.....	.....	.....	.....	.....	1,614.75	35.05	1,649.80
.....	.....	.....	.....	.....	39.45	1.32	40.77
.....	.....	8.75	.....	.....	3,453,229.95	4,291.47	3,457,521.42
Stand. ozs. 34,332.221	Stand. ozs. 6.610	Stand. ozs. 4.109 6.38	Stand. ozs. 37.927	Stand. ozs. 5.854	Stand. ozs. 43,727.020 2,615,785.11	Stand. ozs. 40,514.630 3,477.11	Stand. ozs. 84,241.650 2,619,262.22
\$638,739.01	\$122.99	\$76.45 7.94	\$704.61	\$108.91	\$813,525.95 3,254,475.98	\$753,759.59 4,326.10	\$1,567,285.54 3,258,802.08
6,119.49	2.01	5.55 .81	30.39	3.09	6,744.55 198,753.97	7,426.91 10.53 45.16	14,171.46 198,764.50 45.16

X.—QUANTITY AND COST OF SILVER USED IN THE COINAGE OF SILVER DOLLARS, DOLLARS COINED, AND SEIGNIORAGE ON SAME DURING THE CALENDAR YEAR 1901.

MINT AT PHILADELPHIA

Month.	Used in coinage.		Dollars coined.	Seigniorage.
	Standard ounces.	Cost.		
1901.				
January.....	309,375.00	\$251,928.72	\$360,000.00	\$108,071.28
February.....	429,687.50	349,900.99	500,000.00	150,099.01
March.....	36,394.53	29,636.61	42,350.00	12,713.39
April.....				
May.....	708,125.00	576,636.84	824,000.00	247,363.16
June.....	1,256,492.19	1,023,180.49	1,462,100.00	438,919.51
July.....	343,750.00	279,920.80	400,000.00	120,079.20
August.....	1,301,093.75	1,059,500.21	1,514,000.00	454,499.79
September.....	1,495,385.55	1,217,714.95	1,740,085.00	522,370.05
October.....	73,906.25	60,182.97	86,000.00	25,817.03
November.....				
December.....	29,457.66	23,987.82	34,278.00	10,290.18
Total.....	5,983,667.43	4,872,590.40	6,962,813.00	2,090,222.60

MINT AT SAN FRANCISCO.

1901.				
January.....	290,468.75	\$236,531.66	\$338,000.00	\$101,468.34
February.....	429,687.50	349,899.39	500,000.00	150,100.61
March.....	343,750.00	279,919.74	400,000.00	120,080.26
April.....	343,750.00	279,919.74	400,000.00	120,080.26
May.....	180,468.75	146,957.86	210,000.00	63,042.14
June.....				
July.....				
August.....	187,343.75	152,556.40	218,000.00	65,443.60
September.....	187,343.75	152,556.40	218,000.00	65,443.60
October.....				
November.....				
December.....				
Total.....	1,962,812.50	1,598,341.19	2,284,000.00	685,658.81

MINT AT NEW ORLEANS.

1901.				
January.....	1,289,062.50	\$1,049,702.81	\$1,500,000.00	\$450,297.19
February.....	532,812.50	433,877.18	620,000.00	186,122.82
March.....	945,312.50	769,782.12	1,100,000.00	330,217.88
April.....	1,332,031.25	1,084,692.99	1,550,000.00	465,307.01
May.....	1,289,062.50	1,049,702.89	1,500,000.00	450,297.11
June.....	945,312.50	769,782.12	1,100,000.00	330,217.88
July.....	687,500.00	559,841.54	800,000.00	240,158.46
August.....	171,875.00	139,960.38	200,000.00	60,039.62
September.....	1,332,031.25	1,084,692.99	1,550,000.00	465,307.01
October.....	859,375.00	699,801.93	1,000,000.00	300,198.07
November.....	773,437.50	629,821.74	900,000.00	270,178.26
December.....	1,289,062.50	1,049,702.89	1,500,000.00	450,297.11
Total.....	11,446,875.00	9,321,361.58	13,320,000.00	3,998,638.42

SUMMARY.

1901.				
January.....	1,888,906.25	\$1,538,163.19	\$2,198,000.00	\$659,836.81
February.....	1,392,187.50	1,133,677.56	1,620,000.00	486,322.44
March.....	1,325,457.03	1,079,338.47	1,542,350.00	463,011.53
April.....	1,675,781.25	1,364,612.73	1,950,000.00	585,387.27
May.....	2,177,656.25	1,773,297.59	2,534,000.00	760,702.41
June.....	2,201,804.69	1,792,962.61	2,562,100.00	769,137.39
July.....	1,031,250.00	839,762.34	1,200,000.00	360,237.66
August.....	1,660,312.50	1,352,016.99	1,932,000.00	579,983.01
September.....	3,014,760.55	2,454,964.34	3,508,085.00	1,053,120.66
October.....	933,281.25	759,984.90	1,086,000.00	326,015.10
November.....	773,437.50	629,821.74	900,000.00	270,178.26
December.....	1,318,520.16	1,073,690.71	1,534,278.00	460,587.29
Total.....	19,393,354.93	15,792,293.17	22,566,813.00	6,774,519.83

XI.—QUANTITY AND COST OF SILVER OBTAINED BY TRANSFER AND PURCHASE FOR SUBSIDIARY SILVER. AMOUNT AND COST USED IN COINAGE, COINAGE DERIVED THEREFROM, AND SEIGNIORAGE ON SAME, DURING THE CALENDAR YEAR 1901.

Sources from which bullion was obtained.	Standard ounces.	Cost.	Standard ounces used in coinage.	Cost.	Coinage.	Seigniorage.
MINT AT PHILADELPHIA.						
Uneurrent coins transferred from Treasury	1,711,529.29	\$2,129,429.90	495,110.00	\$616,000.00	\$616,000.00	.....
Amount transferred from act of July 14, 1890 .....	.....	.....	.....	.....	.....	.....
Porto Rican coins redeemed and melted	303.94	225.45	4,522,674.33	3,419,746.53	5,626,966.50	\$2,207,219.97
Partings, charges, and fractions purchased	169,160.85	91,823.89	.....	.....	.....	.....
Melted assay coins purchased	846.77	1,005.39	555.44	317.53	691.05	373.52
Mutilated coins purchased	1,903.14	1,040.14	.....	.....	.....	.....
Surplus bullion purchased	11,047.31	6,341.09	.....	.....	.....	.....
Total	1,894,791.30	2,229,865.86	5,018,339.77	4,036,064.06	6,243,657.55	2,207,593.49
MINT AT SAN FRANCISCO.						
Uneurrent coins transferred from Treasury	160,223.72	199,345.20	190,480.89	236,990.20	236,990.20	.....
Amount transferred from act of July 14, 1890 .....	.....	.....	.....	.....	.....	.....
Partings, charges, and fractions purchased	223,125.91	120,269.39	.....	.....	.....	.....
Mutilated coins purchased	152.70	81.79	212,190.00	116,245.03	264,000.00	147,754.97
Surplus bullion purchased	747.45	412.33	.....	.....	.....	.....
Total	384,249.78	320,108.71	402,670.89	353,235.23	500,990.20	147,754.97
MINT AT NEW ORLEANS.						
Uneurrent coins transferred from Treasury	744,032.10	925,700.88	771,600.00	960,000.00	960,000.00	.....
Amount transferred from act of July 14, 1890	455,726.25	371,104.69	455,726.25	371,104.69	567,000.00	195,895.31
Amount uneurrent coins transferred from mint at Philadelphia	321,500.00	400,000.00	.....	.....	.....	.....
Partings, charges, and fractions purchased	36,900.81	19,621.32	.....	.....	.....	.....
Mutilated coins purchased	475.76	259.70	.....	.....	.....	.....
Surplus bullion purchased	16.36	8.83	.....	.....	.....	.....
Total	1,558,651.28	1,716,695.42	1,227,326.25	1,331,104.69	1,527,000.00	195,895.31
SUMMARY.						
Uneurrent coins transferred from Treasury	2,615,785.11	3,254,475.98	1,457,190.89	1,812,990.20	1,812,990.20	.....
Amount uneurrent coins transferred from mint at Philadelphia to New Orleans mint	321,500.00	400,000.00	455,726.25	371,104.69	567,000.00	195,895.31
Amount transferred from act of July 14, 1890	455,726.25	371,104.69	4,522,674.33	3,419,746.53	5,626,966.50	2,207,219.97
Porto Rican coins redeemed and melted	303.94	225.45	.....	.....	.....	.....
Partings, charges, and fractions purchased	429,187.57	231,714.60	.....	.....	.....	.....
Melted assay coins purchased	846.77	1,005.39	.....	.....	.....	.....
Mutilated coins purchased	2,531.60	1,381.63	212,745.44	116,562.56	264,691.05	148,128.49
Silver bullion purchased	11,811.12	6,762.25	.....	.....	.....	.....
Total	3,837,692.36	4,266,669.99	6,648,336.91	5,720,403.98	8,271,647.75	2,551,243.77

XII.—SILVER FOR SUBSIDIARY COINAGE, CALENDAR YEAR 1901.

Stock.	Standard ounces.	Cost.
MINT AT PHILADELPHIA.		
Silver bullion on hand Jan. 1, 1901	4,784,385.11	\$3,632,354.53
Uncurrent coin transferred from Treasury	1,711,529.29	2,129,429.90
Amount transferred from act of July 14, 1890		
Porto Rican coins redeemed and melted	303.94	225.45
Partings, charges, and fractions purchased	169,160.85	91,823.89
Melted assay coins purchased	846.77	1,005.39
Mutilated coins purchased	1,903.14	1,040.14
Surplus bullion purchased	11,047.31	6,341.09
Total	6,679,176.41	5,862,220.39
Used in coinage, calendar year 1901	5,018,339.77	4,036,064.06
Amount uncurrent coins transferred to mint at New Orleans	321,500.00	400,000.00
Sold in sweeps	11,087.25	6,343.58
Wasted by operative officers	12,737.84	7,311.44
Balance on hand Jan. 1, 1902	1,315,511.55	1,412,501.31
Total	6,679,176.41	5,862,220.39
MINT AT SAN FRANCISCO.		
Silver bullion on hand Jan. 1, 1902	354,232.76	224,219.81
Uncurrent coins transferred from Treasury	160,223.72	199,345.20
Amount transferred from act of July 14, 1890		
Partings, charges, and fractions purchased	223,125.91	120,269.39
Mutilated coins purchased	152.70	81.79
Surplus bullion purchased	747.45	412.33
Total	738,482.54	544,328.52
Used in coinage, calendar year 1901	402,670.89	353,235.23
Sold in sweeps	9,852.17	5,424.30
Wasted by operative officers	1,449.65	799.70
Balance on hand Jan. 1, 1902	324,509.83	184,869.29
Total	738,482.54	544,328.52
MINT AT NEW ORLEANS.		
Silver bullion on hand Jan. 1, 1901	6,926.85	8,394.81
Uncurrent coins transferred from Treasury	744,032.10	925,700.88
Amount uncurrent coins transferred from mint at Philadelphia	321,500.00	400,000.00
Amount transferred from act of July 14, 1890	455,726.25	371,104.69
Partings, charges, and fractions purchased	36,900.81	19,621.32
Mutilated coins purchased	475.76	259.70
Surplus bullion purchased	16.36	8.83
Total	1,565,578.13	1,725,090.23
Used in coinage, calendar year 1901	1,227,326.25	1,331,104.69
Sold in sweeps	25,378.58	13,577.22
Wasted by operative officers	11,685.76	6,307.98
Balance on hand Jan. 1, 1902	301,187.54	374,100.34
Total	1,565,578.13	1,725,090.23
SUMMARY.		
Silver bullion on hand Jan. 1, 1901	5,145,544.72	3,864,969.15
Uncurrent coins transferred from Treasury	2,615,785.11	3,254,475.98
Amount uncurrent coins transferred from mint at Philadelphia to mint at New Orleans	321,500.00	400,000.00
Amount transferred from act of July 14, 1890	455,726.25	371,104.69
Porto Rican coins redeemed and melted	303.94	225.45
Partings, charges, and fractions purchased	429,187.57	231,714.60
Melted assay coins purchased	846.77	1,005.39
Mutilated coins purchased	2,531.60	1,381.63
Surplus bullion purchased	11,811.12	6,762.25
Total	8,983,237.08	8,131,639.14
Used in coinage, calendar year 1901	6,648,336.91	5,720,403.98
Amount uncurrent coins transferred from mint at Philadelphia to New Orleans mint	321,500.00	400,000.00
Sold in sweeps	46,318.00	25,345.10
Wasted by operative officers	25,873.25	14,419.12
Balance on hand Jan. 1, 1902	1,941,208.92	1,971,470.94
Total	8,983,237.08	8,131,639.14

XIII.—COINAGE EXECUTED AT THE MINTS OF THE UNITED

Denominations.	PHILADELPHIA.	
	Pieces.	Value.
GOLD.		
Double eagles	111,526	\$2,230,520.00
Eagles	1,718,825	17,188,250.00
Half eagles	616,040	3,080,200.00
Quarter eagles	91,323	228,307.50
Total gold	2,537,714	22,727,277.50
SILVER.		
Dollars, act of July 14, 1890	6,962,813	6,962,813.00
Subsidiary:		
Half dollars	4,268,813	2,134,406.50
Quarter dollars	8,892,813	2,223,203.25
Dimes	18,860,478	1,886,047.80
Total subsidiary	32,022,104	6,243,657.55
Total silver	38,984,917	13,206,470.55
MINOR.		
Five-cent nickels	26,480,213	1,324,010.65
One-cent bronze	79,611,143	796,111.43
Total minor	106,091,356	2,120,122.08
Total coinage	147,613,987	38,053,870.13

STATES DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1901.

SAN FRANCISCO.		NEW ORLEANS.		TOTAL.	
Pieces.	Value.	Pieces.	Value.	Pieces.	Value.
1,596,000	\$31,920,000.00			1,707,526	\$34,150,520.00
2,812,750	28,127,500.00	72,041	\$720,410.00	4,603,616	46,036,160.00
3,648,000	18,240,000.00			4,264,040	21,320,200.00
				91,323	228,307.50
8,056,750	78,287,500.00	72,041	720,410.00	10,666,505	101,735,187.50
2,284,000	2,284,000.00	13,320,000	13,320,000.00	22,566,813	22,566,813.00
847,044	423,522.00	1,124,000	562,000.00	6,239,857	3,119,928.50
72,664	18,166.00	1,612,000	403,000.00	10,577,477	2,644,369.25
593,022	59,302.20	5,620,000	562,000.00	25,073,500	2,507,350.00
1,512,730	500,990.20	8,356,000	1,527,000.00	41,890,834	8,271,647.75
3,796,730	2,784,990.20	21,676,000	14,847,000.00	64,457,647	30,838,460.75
				26,480,213	1,324,010.65
				79,611,143	796,111.43
				106,091,356	2,120,122.08
11,853,480	81,072,490.20	21,748,041	15,567,410.00	181,215,508	134,693,770.33

Coinage of silver dollars:	
Act of February 28, 1878 (Bland-Allison)	\$378,166,793
Act of July 14, 1890 (Sherman), as follows—	
From July 14, 1890, to date of repeal of purchasing clause of Sherman	
Act, October 31, 1893	\$36,087,285
From November 1, 1893, to June 12, 1898.	42,139,872
Coined under war-revenue bill approved June 13, 1898.	71,483,006
	149,710,163
Act of March 3, 1891, recoinage of trade dollars	5,078,472
Total coinage	532,955,428

XIV.—ASSETS AND LIABILITIES OF THE UNITED STATES

ASSETS.

Institutions.	Gold bullion.		Silver bullion.		Value of gold bullion shipped for coinage.
	Standard ounces.	Value.	Standard ounces.	Value (cost).	
COINAGE MINTS.					
Philadelphia.....	4, 191, 911. 918	\$77, 989, 058. 95	38, 821, 023. 31	\$31, 953, 803. 80	.....
San Francisco.....	699, 893. 172	13, 021, 268. 26	1, 065, 458. 41	786, 604. 54	.....
New Orleans.....	38, 625. 109	718, 606. 52	11, 436, 290. 50	9, 441, 581. 42	.....
ASSAY OFFICES.					
New York.....	1, 684, 852. 099	31, 346, 085. 49	686, 857. 71	467, 569. 20	.....
Carson.....	724. 884	13, 486. 17	2, 701. 65	1, 415. 61	\$15, 049. 27
Denver.....	20, 530. 108	381, 955. 50	2, 728. 78	1, 364. 39	456, 502. 25
Helena.....	4, 393. 874	81, 746. 49	1, 390. 44	695. 22	43, 665. 05
Boise.....	3, 036. 540	56, 493. 76	673. 48	336. 74	107, 144. 48
Charlotte.....	63. 727	1, 185. 63	7. 72	3. 86	24, 272. 70
St. Louis.....	237. 072	4, 410. 65	36. 03	17. 52	.....
Deadwood.....	504. 109	9, 378. 48	475. 27	239. 42	11, 790. 77
Seattle.....	6, 025. 331	112, 099. 17	734. 12	367. 06	.....
Total.....	6, 650, 797. 943	123, 735, 775. 07	52, 016, 377. 42	42, 653, 998. 78	658, 424. 52

LIABILITIES.

Institutions.	Bullion fund.	Undeposited earnings.
COINAGE MINTS.		
Philadelphia.....	\$256,511,054.86	.....
San Francisco.....	145,543,222.11	.....
New Orleans.....	24,479,469.36	.....
ASSAY OFFICES.		
New York.....	32,524,194.94	.....
Carson.....	177,321.51	\$308.53
Denver.....	1,470,566.82	2,489.73
Helena.....	270,418.70	1,276.26
Boise.....	249,785.52	1,402.32
Charlotte.....	47,804.75	200.20
St. Louis.....	14,552.99	33.13
Deadwood.....	114,086.11	116.61
Seattle.....	1,022,964.58	3,971.15
Total.....	462,425,442.25	9,797.93

MINTS AND ASSAY OFFICES, DECEMBER 31, 1901.

ASSETS.

Gold coin.	Silver coin.	Credit bal- ance with assistant treasurer and depository banks.	Minor coin.	Minor coinage metal.	Deficiencies.	Total.
\$56,754,612.50	\$89,937,944.74	.....	\$369,716.27	\$176,799.47	\$13,543.82	\$257,195,479.55
70,971,405.00	56,209,166.53	^a \$4,160,330.28	.....	.....	413,557.96	145,562,332.57
68,935.00	14,675,717.32	.....	.....	.....	25,000.00	24,929,840.26
.....
14,615.00	2,137.28	^b 727,494.93	.....	.....	.....	32,557,901.90
33,480.00	6,107.46	32,541.78	.....	.....	75,549.75	177,630.04
.....	.....	633,234.41	.....	.....	.....	1,473,056.55
.....	.....	145,588.20	.....	.....	.....	271,694.96
.....	.....	87,212.86	.....	.....	.....	251,187.84
.....	.....	22,542.76	.....	.....	.....	48,004.95
.....	.....	10,157.95	.....	.....	.....	14,586.12
.....	.....	92,794.05	.....	.....	.....	114,202.72
.....	.....	914,898.88	.....	.....	.....	1,027,365.11
127,843,047.50	160,831,073.33	6,826,796.10	369,716.27	176,799.47	527,651.53	463,623,282.57

LIABILITIES.

Seigniorage on silver.	Unpaid depositors.	Minor coinage profits.	Minor coin metal fund.	Unpaid cent depositors and subtreasury minor-coin transfers.	Total.
\$10,844.59	\$127,064.36	\$70,662.58	\$49,645.40	\$426,207.76	\$257,195,479.55
.....	19,110.46	.....	.....	.....	145,562,332.57
450,297.11	73.79	.....	.....	.....	24,929,840.26
.....
.....	33,706.96	.....	.....	.....	32,557,901.90
.....	.....	.....	.....	.....	177,630.04
.....	.....	.....	.....	.....	1,473,056.55
.....	.....	.....	.....	.....	271,694.96
.....	.....	.....	.....	.....	251,187.84
.....	.....	.....	.....	.....	48,004.95
.....	.....	.....	.....	.....	14,586.12
.....	.....	.....	.....	.....	114,202.72
.....	429.38	.....	.....	.....	1,027,365.11
461,141.70	180,384.95	70,662.58	49,645.40	426,207.76	463,623,282.57

^aGold coin.

^bGold coin, \$653,690.43; silver coin, \$73,804.50.

XV.—UNREFINED GOLD AND SILVER OF DOMESTIC PRODUCTION, BY VALUE, ITS DISTRIBUTION BY STATES AND TERRITORIES; ALSO REFINED DOMESTIC BULLION (NOT DISTRIBUTED) DEPOSITED AT THE MINTS AND ASSAY OFFICES FROM THEIR ORGANIZATION TO THE CLOSE OF THE CALENDAR YEAR ENDED DECEMBER 31, 1901.

Locality.	Gold.	Silver.	Total.
Alabama	\$274,883.16	\$711.62	\$275,594.78
Alaska	11,943,093.36	110,880.90	12,053,974.26
Arizona	12,760,244.40	14,207,123.44	26,967,367.84
California	788,924,435.20	4,533,942.37	793,458,377.57
Connecticut	125.82	.....	125.82
Colorado	88,999,762.39	25,251,636.69	114,251,399.08
Georgia	10,087,426.59	11,176.28	10,098,602.87
Idaho	42,161,108.00	2,087,750.67	44,248,858.67
Indiana	333.46	1.73	335.19
Iowa	1,318.17	8.03	1,326.20
Kansas	69.32	.25	69.57
Maine	35,703.62	3,719.21	39,422.83
Maryland	19,535.46	45.11	19,580.57
Michigan	502,786.84	4,307,880.82	4,810,667.66
Minnesota	9,048.14	116.27	9,164.41
Missouri	893.61	538.62	1,432.23
Montana	87,342,068.00	22,531,397.89	109,873,465.89
Nebraska	2,340.26	273,226.13	275,566.39
Nevada	44,411,212.77	105,714,795.69	150,126,008.46
New Hampshire	481.34	1.75	483.09
New Mexico	7,290,472.92	7,248,263.91	14,538,736.83
New York	1,058.83	.62	1,059.45
North Carolina	12,077,575.34	71,127.84	12,148,703.18
Oregon	27,465,629.47	191,080.18	27,656,709.65
South Carolina	2,812,451.59	6,803.37	2,819,254.96
South Dakota	80,511,849.91	1,447,508.43	81,959,358.34
Tennessee	92,481.05	18.00	92,499.05
Texas	11,634.80	3,462.81	15,097.61
Utah	6,024,179.26	20,019,229.33	26,043,408.59
Vermont	79,850.34	93.68	79,944.02
Virginia	1,791,023.50	623.89	1,791,647.39
Washington	2,217,781.19	46,558.79	2,264,339.98
West Virginia	243.74	3.72	247.46
Wisconsin	1,109.77	38.54	1,148.31
Wyoming	1,000,110.20	14,200.94	1,014,311.14
Other sources	42,211,059.84	42,962,946.25	85,174,006.09
Unrefined	1,271,065,381.66	251,046,913.77	1,522,112,295.43
Refined	839,592,640.78	562,484,303.58	1,402,076,944.36
Total	2,110,658,022.44	813,531,217.35	2,924,189,239.79

XVI.—PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FROM 1792 TO 1844,
AND ANNUALLY SINCE.

[The estimate for 1792-1873 is by R. W. Raymond, commissioner, and since by Director of the Mint.]

Year.	Gold.	Silver (coining value).	Total.
April 2, 1792-July 31, 1834	\$14, 000, 000	Insignificant.	\$14, 000, 000
July 31, 1834-December 31, 1844	7, 500, 000	\$250, 000	7, 750, 000
1845	1, 008, 000	50, 000	1, 058, 000
1846	1, 140, 000	50, 000	1, 190, 000
1847	889, 000	50, 000	939, 000
1848	10, 000, 000	50, 000	10, 050, 000
1849	40, 000, 000	50, 000	40, 050, 000
1850	50, 000, 000	50, 000	50, 050, 000
1851	55, 000, 000	50, 000	55, 050, 000
1852	60, 000, 000	50, 000	60, 050, 000
1853	65, 000, 000	50, 000	65, 050, 000
1854	60, 000, 000	50, 000	60, 050, 000
1855	55, 000, 000	50, 000	55, 050, 000
1856	55, 000, 000	50, 000	55, 050, 000
1857	55, 000, 000	50, 000	55, 050, 000
1858	50, 000, 000	500, 000	50, 500, 000
1859	50, 000, 000	100, 000	50, 100, 000
1860	46, 000, 000	150, 000	46, 150, 000
1861	43, 000, 000	2, 000, 000	45, 000, 000
1862	39, 200, 000	4, 500, 000	43, 700, 000
1863	40, 000, 000	8, 500, 000	48, 500, 000
1864	46, 100, 000	11, 000, 000	57, 100, 000
1865	53, 225, 000	11, 250, 000	64, 475, 000
1866	53, 500, 000	10, 000, 000	63, 500, 000
1867	51, 725, 000	13, 500, 000	65, 225, 000
1868	48, 000, 000	12, 000, 000	60, 000, 000
1869	49, 500, 000	12, 000, 000	61, 500, 000
1870	50, 000, 000	16, 000, 000	66, 000, 000
1871	43, 500, 000	23, 000, 000	66, 500, 000
1872	36, 000, 000	28, 750, 000	64, 750, 000
1873	36, 000, 000	35, 750, 000	71, 750, 000
1874	33, 500, 000	37, 300, 000	70, 800, 000
1875	33, 400, 000	31, 700, 000	65, 100, 000
1876	39, 900, 000	38, 800, 000	78, 700, 000
1877	46, 900, 000	39, 800, 000	86, 700, 000
1878	51, 200, 000	45, 200, 000	96, 400, 000
1879	38, 900, 000	40, 800, 000	79, 700, 000
1880	36, 000, 000	39, 200, 000	75, 200, 000
1881	34, 700, 000	43, 000, 000	77, 700, 000
1882	32, 500, 000	46, 800, 000	79, 300, 000
1883	30, 000, 000	46, 200, 000	76, 200, 000
1884	30, 800, 000	48, 800, 000	79, 600, 000
1885	31, 800, 000	51, 600, 000	83, 400, 000
1886	35, 000, 000	51, 000, 000	86, 000, 000
1887	33, 000, 000	53, 350, 000	86, 350, 000
1888	33, 175, 000	59, 195, 000	92, 370, 000
1889	32, 800, 000	64, 646, 000	97, 446, 000
1890	32, 845, 000	70, 465, 000	103, 310, 000
1891	33, 175, 000	75, 417, 000	108, 592, 000
1892	33, 000, 000	82, 101, 000	115, 101, 000
1893	35, 955, 000	77, 576, 000	113, 531, 000
1894	39, 500, 000	64, 000, 000	103, 500, 000
1895	46, 610, 000	72, 051, 000	118, 661, 000
1896	53, 088, 000	76, 069, 000	129, 157, 000
1897	57, 363, 000	69, 637, 000	127, 000, 000
1898	64, 463, 000	70, 384, 000	134, 847, 000
1899	71, 053, 000	70, 807, 000	141, 860, 000
1900	79, 171, 000	74, 533, 000	153, 704, 000
1901	78, 667, 000	71, 388, 000	150, 055, 000
Total	2, 463, 752, 000	1, 801, 719, 000	4, 265, 471, 000

XVII.—HIGHEST, LOWEST, AND AVERAGE PRICE OF BAR SILVER IN LONDON, PER OUNCE BRITISH STANDARD (.925), SINCE 1833, AND THE EQUIVALENT IN UNITED STATES GOLD COIN OF AN OUNCE 1,000 FINE, TAKEN AT THE AVERAGE PRICE.

Calendar years.	Highest quotation.	Lowest quotation.	Average quotation.	Value of a fine ounce at average quotation.	Calendar years.	Highest quotation.	Lowest quotation.	Average quotation.	Value of a fine ounce at average quotation.
	<i>d.</i>	<i>d.</i>	<i>d.</i>	<i>Dollars.</i>		<i>d.</i>	<i>d.</i>	<i>d.</i>	<i>Dollars.</i>
1833.....	59 ⁷ / ₈	58 ³ / ₄	59 ³ / ₁₆	1.297	1868.....	61 ¹ / ₈	60 ¹ / ₈	60 ¹ / ₈	1.326
1834.....	60 ³ / ₄	59 ³ / ₄	59 ¹³ / ₁₆	1.313	1869.....	61	60	60 ⁷ / ₁₆	1.325
1835.....	60	59 ¹ / ₄	59 ¹ / ₁₆	1.303	1870.....	60 ³ / ₄	60 ¹ / ₄	60 ¹ / ₁₆	1.328
1836.....	60 ³ / ₄	59 ³ / ₈	60	1.315	1871.....	61	60 ³ / ₁₆	60 ¹ / ₈	1.326
1837.....	60 ³ / ₈	59	59 ⁹ / ₁₆	1.305	1872.....	61 ¹ / ₈	59 ¹ / ₄	60 ⁵ / ₁₆	1.322
1838.....	60 ³ / ₈	59 ¹ / ₂	59 ⁷ / ₁₆	1.304	1873.....	59 ¹ / ₈	57 ⁷ / ₈	59 ³ / ₁₆	1.29769
1839.....	60 ⁵ / ₈	60	60 ³ / ₈	1.323	1874.....	59 ¹ / ₂	57 ¹ / ₄	58 ⁵ / ₁₆	1.27883
1840.....	60 ³ / ₄	60 ¹ / ₈	60 ³ / ₈	1.323	1875.....	57 ¹ / ₂	55 ¹ / ₂	56 ¹ / ₁₆	1.24233
1841.....	60 ³ / ₈	59 ³ / ₄	60 ¹ / ₁₆	1.316	1876.....	58 ¹ / ₂	46 ³ / ₄	53 ¹ / ₈	1.16414
1842.....	60	59 ¹ / ₄	59 ¹ / ₁₆	1.303	1877.....	58	53 ¹ / ₄	54 ³ / ₈	1.20189
1843.....	59 ⁵ / ₈	59	59 ³ / ₁₆	1.297	1878.....	55 ¹ / ₄	49 ¹ / ₈	52 ⁵ / ₈	1.15358
1844.....	59 ³ / ₄	59 ¹ / ₄	59 ¹ / ₂	1.304	1879.....	53 ³ / ₄	58 ⁷ / ₈	51 ¹ / ₄	1.12392
1845.....	59 ¹ / ₂	58 ⁷ / ₈	59 ¹ / ₁₆	1.298	1880.....	52 ¹ / ₂	51 ¹ / ₂	52 ¹ / ₂	1.14507
1846.....	60 ¹ / ₈	59	59 ⁵ / ₁₆	1.300	1881.....	52 ⁷ / ₈	50 ⁷ / ₈	51 ⁵ / ₈	1.13229
1847.....	60 ³ / ₈	58	59 ¹ / ₁₆	1.308	1882.....	52	50	51 ³ / ₈	1.13562
1848.....	60	58 ¹ / ₂	59 ¹ / ₂	1.304	1883.....	51 ³ / ₈	50 ¹ / ₁₆	50 ⁹ / ₁₆	1.10874
1849.....	60	59 ¹ / ₄	59 ³ / ₄	1.309	1884.....	51	49 ¹ / ₁₆	50 ¹ / ₁₆	1.11068
1850.....	61 ¹ / ₂	59 ¹ / ₄	61 ¹ / ₁₆	1.316	1885.....	50	46 ⁷ / ₈	48 ⁹ / ₈	1.06510
1851.....	61	60	61	1.337	1886.....	47	42	45 ⁵ / ₈	.99467
1852.....	61 ⁷ / ₈	59 ⁷ / ₈	60 ¹ / ₄	1.326	1887.....	47 ¹ / ₈	43 ¹ / ₄	44 ¹ / ₁₆	.97946
1853.....	61 ⁷ / ₈	60	61 ¹ / ₂	1.348	1888.....	44 ⁹ / ₁₆	41 ⁵ / ₈	42 ⁷ / ₈	.93974
1854.....	61 ⁷ / ₈	60	61 ¹ / ₄	1.348	1889.....	44 ³ / ₈	41 ¹ / ₁₆	42 ¹ / ₁₆	.93511
1855.....	61 ⁵ / ₈	60	61 ⁵ / ₁₆	1.344	1890.....	54 ⁵ / ₈	43 ⁵ / ₈	47 ³ / ₄	1.04634
1856.....	62 ¹ / ₂	60 ¹ / ₈	61 ⁵ / ₁₆	1.344	1891.....	48 ³ / ₄	43 ¹ / ₂	45 ¹ / ₁₆	.98800
1857.....	62 ³ / ₈	61	61 ³ / ₄	1.353	1892.....	43 ³ / ₄	37 ⁷ / ₈	39 ³ / ₄	.87145
1858.....	61 ⁷ / ₈	60 ³ / ₄	61 ⁵ / ₁₆	1.344	1893.....	38 ³ / ₄	30 ⁵ / ₈	35 ⁹ / ₁₆	.78030
1859.....	62 ³ / ₄	61 ³ / ₄	62 ¹ / ₁₆	1.360	1894.....	31 ³ / ₄	27	28 ¹ / ₁₆	.63479
1860.....	62 ³ / ₈	61 ¹ / ₄	61 ¹ / ₁₆	1.352	1895.....	31 ³ / ₈	27 ³ / ₁₆	29 ¹ / ₁₆	.65406
1861.....	61 ⁷ / ₈	60 ¹ / ₈	60 ¹ / ₁₆	1.333	1896.....	31 ¹ / ₁₆	29 ³ / ₄	30 ¹ / ₁₆	.67565
1862.....	62 ¹ / ₈	61	61 ⁷ / ₁₆	1.346	1897.....	29 ¹ / ₁₆	23 ⁵ / ₈	27 ⁹ / ₁₆	.60438
1863.....	61 ³ / ₄	61	61 ³ / ₈	1.345	1898.....	28 ³ / ₈	25	26 ¹ / ₁₆	.59010
1864.....	62 ¹ / ₂	60 ⁵ / ₈	61 ³ / ₈	1.345	1899.....	29	26 ⁵ / ₈	27 ⁷ / ₁₆	.60154
1865.....	61 ⁵ / ₈	60 ¹ / ₂	61 ¹ / ₁₆	1.338	1900.....	30 ¹ / ₄	27	28 ⁵ / ₁₆	.62007
1866.....	62 ¹ / ₄	60 ³ / ₈	61 ¹ / ₈	1.339	1901.....	29 ⁹ / ₁₆	24 ⁵ / ₁₆	27 ⁵ / ₁₆	.59595
1867.....	61 ¹ / ₄	60 ³ / ₈	60 ⁹ / ₁₆	1.328					

XVIII.—COMMERCIAL RATIO OF SILVER TO GOLD EACH YEAR SINCE 1687.

[NOTE.—From 1687 to 1832 the ratios are taken from Dr. A. Soetbeer; from 1833 to 1878 from Pixley and Abell's tables; and from 1879 to 1896 from daily cablegrams from London to the Bureau of the Mint.]

Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.
1687....	14.94	1723....	15.20	1759....	14.15	1795....	15.55	1831....	15.72	1867....	15.57
1688....	14.94	1724....	15.11	1860....	14.14	1796....	15.65	1832....	15.73	1868....	15.59
1689....	15.02	1725....	15.11	1761....	14.54	1797....	15.41	1833....	15.93	1869....	15.60
1690....	15.02	1726....	15.15	1762....	15.27	1798....	15.59	1834....	15.73	1870....	15.57
1691....	14.98	1727....	15.24	1763....	14.99	1799....	15.74	1835....	15.80	1871....	15.57
1692....	14.92	1728....	15.11	1764....	14.70	1800....	15.68	1836....	15.72	1872....	15.63
1693....	14.83	1729....	14.92	1765....	14.83	1801....	15.46	1837....	15.83	1873....	15.93
1694....	14.87	1730....	14.81	1766....	14.80	1802....	15.26	1838....	15.85	1874....	16.16
1695....	15.02	1731....	14.94	1767....	14.85	1803....	15.41	1839....	15.62	1875....	16.64
1696....	15.00	1732....	15.09	1768....	14.80	1804....	15.41	1840....	15.62	1876....	17.75
1697....	15.20	1733....	15.18	1769....	14.72	1805....	15.79	1841....	15.70	1877....	17.20
1698....	15.07	1734....	15.39	1770....	14.62	1806....	15.52	1842....	15.87	1878....	17.92
1699....	14.94	1735....	15.41	1771....	14.66	1807....	15.43	1843....	15.93	1879....	18.39
1700....	14.81	1736....	15.18	1772....	14.52	1808....	16.08	1844....	15.85	1880....	18.05
1701....	15.07	1737....	15.02	1773....	14.62	1809....	15.96	1845....	15.92	1881....	18.25
1702....	15.52	1738....	14.91	1774....	14.62	1810....	15.77	1846....	15.90	1882....	18.20
1703....	15.17	1739....	14.91	1775....	14.72	1811....	15.53	1847....	15.80	1883....	18.64
1704....	15.22	1740....	14.94	1776....	14.55	1812....	16.11	1848....	15.85	1884....	18.61
1705....	15.11	1741....	14.92	1777....	14.54	1813....	16.25	1849....	15.78	1885....	19.41
1706....	15.27	1742....	14.85	1778....	14.68	1814....	15.04	1850....	15.70	1886....	20.78
1707....	15.44	1743....	14.85	1779....	14.80	1815....	15.26	1851....	15.46	1887....	21.10
1708....	15.41	1744....	14.87	1780....	14.72	1816....	15.28	1852....	15.59	1888....	22.00
1709....	15.31	1745....	14.98	1781....	14.78	1817....	15.11	1853....	15.33	1889....	22.10
1710....	15.22	1746....	15.13	1782....	14.42	1818....	15.35	1854....	15.33	1890....	19.75
1711....	15.29	1747....	15.26	1783....	14.48	1819....	15.33	1855....	15.38	1891....	20.92
1712....	15.31	1748....	15.11	1784....	14.70	1820....	15.62	1856....	15.38	1892....	23.72
1713....	15.24	1749....	14.80	1785....	14.92	1821....	15.95	1857....	15.27	1893....	26.49
1714....	15.13	1750....	14.55	1786....	14.96	1822....	15.80	1858....	15.38	1894....	32.56
1715....	15.11	1751....	14.39	1787....	14.92	1823....	15.84	1859....	15.19	1895....	31.60
1716....	15.09	1752....	14.54	1788....	14.65	1824....	15.82	1860....	15.29	1896....	30.59
1717....	15.13	1753....	14.54	1789....	14.75	1825....	15.70	1861....	15.50	1897....	34.20
1718....	15.11	1754....	14.48	1790....	15.04	1826....	15.76	1862....	15.35	1898....	35.03
1719....	15.09	1755....	14.68	1791....	15.05	1827....	15.74	1863....	15.37	1899....	34.36
1720....	15.04	1756....	14.94	1792....	15.17	1828....	15.78	1864....	15.37	1900....	33.33
1721....	15.05	1757....	14.87	1793....	15.00	1829....	15.78	1865....	15.44	1901....	34.68
1722....	15.17	1758....	14.85	1794....	15.37	1830....	15.82	1866....	15.43		

XIX.—IMPORTS OF GOLD AND SILVER, BY CUSTOMS

[Compiled by the

Customs districts.	GOLD.					
	In ore and base bul- lion.	Bullion refined.		Coin.		Total gold.
				United States.	Foreign.	
	<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Boston and Charlestown, Mass.		4,530	86,656		243	86,899
Fernandina, Fla.				4,600		4,600
Hartford, Conn.				1,173		1,173
Newark, N. J.	66,368	49	1,001			67,369
New York, N. Y.	1,241,069	76,238	1,567,828	2,236,046	1,013,400	6,058,343
Passamaquoddy, Me.		13,890	270,902			270,902
Perth Amboy, N. J.	102,904					102,904
Philadelphia, Pa.	16				9,663	9,679
Porto Rico				476		476
Galveston, Tex.						
Mobile, Ala.		159	2,697	245	7,417	10,359
New Orleans, La.		18,052	368,372	12,255		380,627
Arizona	204,080	59,874	1,197,172			1,401,252
Brazos de Santiago, Tex.						
Corpus Christi, Tex.	28,269	105,141	2,173,277	246,018		2,447,564
Paso del Norte, Tex.	389,753	12,870	257,295		12,251	659,299
Saluria, Tex.	26,915	22,184	431,664		593	459,172
Alaska	13,789,803	92,430	1,478,889	16,456	35,897	15,321,045
Hawaii						
Puget Sound, Wash.	2,723,233	126,743	1,927,262	139,919		4,790,414
San Diego, Cal.	6,697	2,657	38,706			45,403
San Francisco, Cal.	959,067	88,364	1,899,008	83,964	15,477,083	18,419,122
Buffalo Creek, N. Y.		42	850			850
Cape Vincent, N. Y.				1,535		1,535
Champlain, N. Y.	326,710			911,300	300,167	1,538,177
Chicago, Ill.	65,177					65,177
Detroit, Mich.	100	10	172	225		497
Huron, Mich.	10					10
Montana and Idaho.		158	2,840			2,840
Niagara, N. Y.		18,110	294,438	500,000	14,870	809,308
North and South Dakota.	138,797	8	162			138,959
Oswegatchie, N. Y.	1,450,495					1,450,495
Vermont, Vt.	4,788	20	442	212,200		217,430
Omaha, Nebr.						
Total	21,524,251	641,529	11,999,633	4,366,412	16,871,584	54,761,880

DISTRICTS, DURING THE CALENDAR YEAR 1901.

Bureau of Statistics.]

SILVER.					
In ore and base bullion.	Bullion.		Coin.		Total silver.
			United States.	Foreign.	
<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
			501		501
			226		226
			190		190
395,472	55	34			395,506
9,709,853	5,307,752	3,184,717	137,900	276,972	13,309,442
1,051,802					1,051,802
48,872				582	49,454
287,128					287,128
			742	3,907	4,649
	4,333	2,600		374,313	376,913
733,248	891,740	529,887			1,263,135
				39,750	39,750
484,963	335,344	209,385		22,114	716,462
2,661,699	1,436,702	816,622		2,970,233	6,448,554
115,086	1,812,240	885,690		2,746	1,003,522
				3	3
			1,963	4,853	6,816
911,337			73,671		985,008
971,674	4,310,436	2,789,874	15,607	502,820	4,279,975
	3,056	1,742			1,742
			44,414		44,414
89,119					89,119
1,505	11,749	6,503	6,751	151	14,910
	3,420	1,737			1,737
230,019					230,019
	7,029	4,046	15,247		19,293
39,053			29,194		68,247
404,965					404,965
	500	300			300
53,000					53,000
18,188,795	14,124,356	8,433,137	326,406	4,198,444	31,146,782

XX.—IMPORTS OF GOLD AND SILVER, BY COUN

[Compiled by the

Countries.	GOLD.					
	In ore and base bul- lion.	Bullion refined.		Coin.		Total gold.
				United States.	Foreign.	
	<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Azores, and Madeira Islands.....				27,740		27,740
France		216	4,453	974,650	200,172	1,179,275
Germany						
Gibraltar						
United Kingdom.....		11,812	243,325	1,173	10,360	254,858
British Honduras.....		786	13,924	7,692		21,616
Dominion of Canada:						
Nova Scotia, N. Brunswick, etc.....		18,420	357,558			357,558
Quebec, Ontario, etc	331,608	17,771	287,787	1,625,260	315,037	2,559,692
British Columbia.....	18,619,476	225,271	3,535,932	159,370	35,897	22,350,675
Newfoundland and Labrador.....					206	206
Central American States:						
Costa Rica.....		5,967	123,655	7,740	9,650	141,045
Guatemala.....				118	7,847	7,965
Honduras		5,533	112,857	8,522		121,379
Nicaragua.....		19,064	392,756	21,890	535	415,181
Salvador.....	9	519	10,982	1,843	1,518	14,352
Mexico.....	2,308,884	253,217	5,164,052	295,137	23,957	7,792,030
Miquelon, Langley, etc.....				1,600		1,600
West Indies:						
British	1,060	1,322	26,707	31,302	45,665	104,734
Cuba				170,000	694,850	864,850
Danish				42,700	725	43,425
Dutch				147,969	24,439	172,408
French				2,000		2,000
Haiti				498,549	292	498,841
Santo Domingo.....		55	1,135	39,636	11,163	51,934
Chile	217,119	678	13,742			230,861
Colombia.....	30	22,828	467,323	29,960	4,065	501,378
Ecuador.....	22,890	3,371	69,102	10	80	92,082
Guianas—British		652	13,425	810	214	14,449
Dutch		460	9,445			9,445
Peru.....	18,729	5,339	114,797	40,000		173,526
Venezuela.....		806	16,658	205,984	9,857	232,499
Chinese Empire				2,800	39,840	42,640
Japan	600			20,080	3,998,900	4,019,580
British Australasia.....	3,846	47,442	1,020,018	1,742	11,436,315	12,461,921
French Oceania				135		135
Philippine Islands						
Total	21,524,251	641,529	11,999,633	4,366,412	16,871,584	54,761,880

TRIES, DURING THE CALENDAR YEAR 1901.

Bureau of Statistics.]

SILVER.					
In ore and base bullion.	Bullion.		Coin.		Total silver.
			United States.	Foreign.	
<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
			1,396		1,396
			812	3,908	4,720
223				95	318
			113		113
	3,009	1,807	2,331	23,159	27,297
				298,207	298,207
54,505	21,860	12,116	93,592	151	160,364
2,509,346	3,949	2,246	75,685	3	2,587,280
			196	1,256	1,452
	2,281	1,369		46,500	47,869
				25,243	25,243
	831,230	499,177		30,303	529,480
23,483				55,945	79,428
	6,000	3,746		1,796	5,542
14,093,647	13,164,771	7,857,921	3,189	3,620,140	25,574,897
	3,765	2,259	13,009	4,611	19,879
			62,500		62,500
			27,331	7,661	34,992
			7,464	2,852	10,316
			3,015	2,200	5,215
	941	565	14,553	10,757	25,875
1,430,738	62,195	37,317			1,468,055
6,058	24,135	14,482	3,149	4,459	28,148
	220	132		41	173
				34,066	34,066
70,469				9,733	80,202
				3,579	3,579
			17,570	10,209	27,779
326					326
				1,570	1,570
			501		501
18,188,795	14,124,356	8,433,137	326,406	4,198,444	31,146,782

XXI.—EXPORTS, BY CUSTOMS DISTRICTS AND COUNTRIES, OF DOMESTIC GOLD

[Compiled by the

Customs districts and countries.	GOLD.				
	In ore and base bul- lion.	Bullion.			
		United States Mint or assay office bars.		Other.	
CUSTOMS DISTRICTS.	Dollars.	Ounces.	Dollars.	Ounces.	Dollars.
Baltimore, Md					
Bangor, Me					
Boston and Charlestown, Mass					
New York, N. Y	294,704	2,268,850	46,492,737		
Corpus Christi, Tex					
Key West, Fla					
New Orleans, La					
Saluria, Tex					
Hawaii					
Puget Sound, Wash	33,439			4,035	60,650
San Francisco, Cal				9,720	200,350
Buffalo Creek, N. Y				1,008	20,791
Champlain, N. Y					
Detroit, Mich					
Memphremagog, Vt				35	735
Niagara, N. Y				5,105	101,828
Vermont, Vt				81	1,704
Total	328,143	2,268,850	46,492,737	19,984	386,058
COUNTRIES.					
Austria-Hungary		12,318	253,056		
France		1,664,897	33,982,318		
Germany	16,850	530,795	11,004,210		
Netherlands					
Spain					
Sweden and Norway		12,064	249,000		
United Kingdom	277,854	48,776	1,004,153		
Dominion of Canada:					
Nova Scotia, New Brunswick, etc					
Quebec, Ontario, etc				6,229	125,058
British Columbia	33,439			4,035	60,650
Central American States:					
Guatemala					
Honduras					
Nicaragua					
Mexico					
West Indies:					
British					
Cuba					
Dutch					
Haiti					
Santo Domingo					
Brazil					
Colombia					
Guianas—British					
Dutch					
Uruguay					
Venezuela					
Chinese Empire					
Hongkong				9,720	200,350
Japan					
Total	328,143	2,268,850	46,492,737	19,984	386,058

AND SILVER FROM THE UNITED STATES DURING THE CALENDAR YEAR 1901.

Bureau of Statistics.]

GOLD.		SILVER.				
Coin.	Total gold.	In ore and base bul- lion.	Bullion.		Coin.	Total silver.
<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
580	580		50	31	500	500
1,000	1,000				8,000	31
6,696,208	53,483,649	104,955	76,809,986	45,785,137	216,737	8,000
			1,438,841	851,138		46,106,829
					8,000	851,138
4,800	4,800				1,500	8,000
1,715	1,715				180	1,500
31,370	31,370					180
45,276	139,365	6,428	338,155	181,392	37,516	225,336
50,717	251,067		7,435,570	4,349,424		4,349,424
	20,791		55,545	33,165		33,165
2,386,757	2,386,757					
					3,449	3,449
	735		513	314	200	514
101,612	203,440		46,321	27,512	7,320	34,832
5,450	7,154		52,899	34,159		34,159
9,325,485	56,532,423	111,383	86,177,880	51,262,272	283,402	51,657,057
	253,056					
	33,982,318		1,733,776	1,050,655		1,050,655
3,775,000	14,796,060	2,800			900	3,700
850,000	850,000					
			1,035	600		600
	249,000					
250,000	1,532,007	102,155	75,073,245	44,732,679		44,834,834
			50	31		31
2,493,819	2,618,877		155,278	95,150	10,969	106,119
45,276	139,365	6,428	40,131	23,276	37,516	67,220
720	720				500	500
4,000	4,000					
5,300	5,300				1,000	1,000
60,020	60,020		1,438,841	851,138	180	851,318
17,540	17,540				5,950	5,950
177,500	177,500				25,850	25,850
12,760	12,760					
279,043	279,043					
246,990	246,990				199,912	199,912
500	500					
5,650	5,650					
			300	187		187
7,000	7,000		1,630	1,016		1,016
1,000,000	1,000,000					
13,000	13,000				625	625
			533,108	300,227		300,227
81,147	281,497		7,200,486	4,207,313		4,207,313
220	220					
9,325,485	56,532,423	111,383	86,177,880	51,262,272	283,402	51,657,057

XXII.—EXPORTS, BY CUSTOMS DISTRICTS AND COUNTRIES, OF FOREIGN GOLD

[Compiled by the

Customs districts and countries.	GOLD.				
	In ore and base bul- lion.	Bullion refined.		Coin.	Total gold.
CUSTOMS DISTRICTS.	<i>Dollars.</i>	<i>Ounces,</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Baltimore, Md.....					
New York, N. Y.....		5,248	103,656	416,983	550,639
Porto Rieo.....				14,500	14,500
Galveston, Tex.....				515	515
New Orleans, La.....					
Paso del Norte, Tex.....					
Saluria, Tex.....					
Alaska.....	684,446				684,446
Hawaii.....				1,400	1,400
San Francisco, Cal.....					
Champlain, N. Y.....					
Detroit, Mich.....					
Memphremagog, Vt.....				16	16
Vermont, Vt.....					
Total.....	684,446	5,248	103,656	463,414	1,251,516
COUNTRIES.					
France.....				230,811	230,811
Germany.....				3,840	3,840
Spain.....				14,500	14,500
United Kingdom.....		5,248	103,656		103,656
British Honduras.....					
Dominion of Canada:					
Quebec, Ontario, etc.....				16	16
British Columbia.....	684,446				684,446
Central American States:					
Honduras.....					
Nicaragua.....				515	515
Mexico.....					
West Indies:					
British.....					
Cuba.....				212,332	212,332
Duteh.....					
Brazil.....					
Colombia.....					
Guiana—British.....					
Hongkong.....					
British Australasia.....				1,400	1,400
French Oceania.....					
Total.....	684,446	5,248	103,656	463,414	1,251,516

AND SILVER FROM THE UNITED STATES DURING THE CALENDAR YEAR 1901.

Bureau of Statistics.]

SILVER.				
In ore and base bullion.	Bullion.		Coin.	Total silver.
<i>Dollars.</i>	<i>Ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
			4, 466	4, 466
	180	100	423, 087	423, 187
			24, 174	24, 174
			50, 900	50, 900
			28, 100	28, 100
			393	393
			2, 000	2, 000
			3, 279, 213	3, 279, 213
			89, 035	89, 035
			34, 648	34, 648
			45, 185	45, 185
	180	100	3, 981, 201	3, 981, 301
			2, 240	2, 240
	180	100	286, 550	286, 650
			2, 000	2, 000
			168, 868	168, 868
			2, 393	2, 393
			24, 834	24, 834
			22, 158	22, 158
			196, 150	196, 150
			29, 928	29, 928
			142	142
			100	100
			4, 466	4, 466
			13, 059	13, 059
			3, 220, 484	3, 220, 484
			7, 829	7, 829
	180	100	3, 981, 201	3, 981, 301

XXIII.—SUMMARY OF IMPORTS AND EXPORTS OF GOLD AND SILVER DURING THE CALENDAR YEAR 1901.

[Compiled by the Bureau of Statistics.]

Kind of coin and bullion.	Imports.	Exports.		
		Domestic.	Foreign.	Total.
GOLD.				
Ore.....	\$21, 524, 251	\$328, 143	\$684, 446	\$1, 012, 589
Bullion	11, 999, 633	46, 878, 795	103, 656	46, 982, 451
Coin:				
United States	4, 366, 412	9, 325, 485	.....	9, 325, 485
Foreign	16, 871, 584	.....	463, 414	463, 414
Total.....	54, 761, 880	56, 532, 423	1, 251, 516	57, 783, 939
SILVER.				
Ore.....	18, 188, 795	111, 383	.....	111, 383
Bullion	8, 433, 137	51, 262, 272	100	51, 262, 372
Coin:				
United States	326, 406	283, 402	.....	283, 402
Foreign	4, 198, 444	.....	3, 981, 201	3, 981, 201
Total.....	31, 146, 782	51, 657, 057	3, 981, 301	55, 638, 358

XXIV. IMPORTS AND EXPORTS OF THE PRECIOUS METALS OF THE PRINCIPAL COUNTRIES OF THE WORLD.

TABLE SHOWING THE VALUE OF THE GOLD AND SILVER COIN AND BULLION IMPORTED INTO AND EXPORTED FROM THE PRINCIPAL COUNTRIES OF THE WORLD, ALSO THE EXCESS OF IMPORTS OVER EXPORTS OR EXPORTS OVER IMPORTS, FOR A SERIES OF YEARS.

UNITED STATES.

Value of GOLD COIN and BULLION imported into and exported from the United States, fiscal years since 1825.

Year ending—	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
September 30—				
1825	\$529,277	\$315,672	\$213,605	.....
1826	678,740	1,056,088	.....	\$377,348
1827	1,110,448	1,872,489	.....	762,041
1828	808,220	1,635,084	.....	826,864
1829	816,666	1,573,258	.....	756,592
1830	821,146	1,422,664	.....	601,518
1831	932,029	2,979,529	.....	2,047,500
1832	716,686	2,049,406	.....	1,332,720
1833	611,852	889,505	.....	277,653
1834	3,766,172	690,180	3,075,992	.....
1835	2,325,196	1,355,280	969,916	.....
1836	7,231,862	647,455	6,584,407	.....
1837	2,431,814	3,213,735	.....	781,921
1838	11,674,883	1,213,204	10,461,679	.....
1839	1,164,580	4,800,668	.....	3,636,088
1840	3,085,157	3,703,373	.....	618,216
1841	1,269,449	3,589,869	.....	2,320,420
1842	757,294	2,304,756	.....	1,547,462
June 30—				
1843 <i>a</i>	17,066,437	407,687	16,658,750	.....
1844	1,613,304	1,366,521	246,783	.....
1845	818,850	3,055,425	.....	2,236,575
1846	910,413	2,053,199	.....	1,142,786
1847	21,574,931	1,037,921	20,537,010	.....
1848	3,408,755	11,071,197	.....	7,662,442
1849	4,068,647	1,972,233	2,096,414	.....
1850	1,776,706	4,560,627	.....	2,783,921
1851	3,569,090	22,836,913	.....	19,267,823
1852	3,658,059	40,073,979	.....	36,415,920
1853	2,427,356	25,442,858	.....	23,015,502
1854	3,212,719	40,554,464	.....	37,341,745
1855	1,092,802	55,109,215	.....	54,016,413
1856	990,305	45,000,977	.....	44,010,672
1857	6,654,636	65,232,653	.....	58,578,017
1858	11,566,068	50,002,804	.....	38,436,736
1859	2,125,397	61,108,053	.....	58,982,656
1860	2,508,786	58,446,039	.....	55,937,253
1861	42,291,930	27,423,973	14,867,957	.....
1862	12,907,011	35,439,903	.....	21,532,892
1863	5,530,538	62,162,838	.....	56,632,300
1864	11,176,769	100,661,634	.....	89,484,865
1865	6,498,228	58,381,033	.....	51,882,805
1866	8,196,261	71,197,309	.....	63,001,048
1867	17,024,866	39,026,627	.....	22,001,761
1868	8,737,443	73,396,344	.....	64,658,901
1869	14,132,568	36,003,498	.....	21,870,930
1870	12,056,950	33,635,962	.....	21,579,012
1871	6,883,561	66,686,208	.....	59,802,647
1872	8,717,458	49,548,760	.....	40,831,302
1873	8,682,447	44,856,715	.....	36,174,268
1874	19,503,137	34,042,420	.....	14,539,283
1875	13,696,793	66,980,977	.....	53,284,184
1876	7,992,709	31,177,050	.....	23,184,341
1877	26,246,234	26,590,374	.....	344,140
1878	13,330,215	9,204,455	4,125,760	.....
1879	5,624,948	4,587,614	1,037,334	.....
1880	80,758,396	3,639,025	77,119,371	.....
1881	100,031,259	2,565,132	97,466,127	.....
1882	34,377,054	32,587,880	1,789,174	.....
1883	17,734,149	11,600,888	6,133,261	.....
1884	22,831,317	41,081,957	.....	18,250,640
Amount carried forward.....	635,736,973	1,487,123,556	263,383,540	1,114,770,123

a Nine months.

Value of GOLD COIN and BULLION imported into and exported from the United States, fiscal years since 1825—Continued.

Year ending—	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
Amount brought forward.....	\$635,736,973	\$1,487,123,556	\$263,383,540	\$1,114,770,123
June 30—				
1885.....	26,691,696	8,477,892	18,213,804	
1886.....	20,743,349	42,952,191		22,208,842
1887.....	42,910,601	9,701,187	33,209,414	
1888.....	43,931,317	18,376,234	25,558,083	
1889.....	10,372,145	60,033,246		49,661,101
1890.....	13,097,146	17,350,193		4,253,047
1891.....	18,516,112	86,462,880		67,946,768
1892.....	50,162,879	50,305,533		142,654
1893.....	22,069,380	108,966,655		86,897,275
1894.....	72,989,563	77,162,228		4,172,665
1895.....	36,384,760	66,502,136		30,117,376
1896.....	33,507,853	112,412,465		78,904,612
1897.....	85,021,992	40,412,151	44,609,841	
1898.....	120,402,195	15,533,719	104,868,476	
1899.....	88,978,882	37,549,783	51,429,099	
1900.....	44,573,184	48,266,759		3,693,575
1901.....	66,051,187	53,185,177	12,866,010	
1902.....	52,021,254	48,568,950	3,452,304	
Total.....	1,484,165,468	2,389,342,935	557,590,571	1,462,768,038

NOTE.—There were no exports of domestic gold previous to 1826, the exports of domestic gold not being separately stated from 1826 to 1861, and in 1863 were included in the exports of domestic silver by the Bureau of Statistics (Statistical Abstracts, 1879-1891). In the Abstracts for 1892-93 this item is omitted entirely, while in the Abstracts for 1894-95 it is included in the gold exports, with the following note appended: "Gold and silver can not be separately stated prior to 1864, but it is probable that the greater portion of the exports was gold."

Value of SILVER COIN and BULLION imported into and exported from the United States, fiscal years since 1821.

Year ending—	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
September 30—				
1821.....	\$8,064,890	\$10,478,059		\$2,413,169
1822.....	3,369,846	10,810,180		7,440,334
1823.....	5,097,896	6,372,987		1,275,091
1824.....	8,378,970	7,014,552	\$1,364,418	
1825.....	5,621,488	8,481,383		2,859,895
1826.....	6,202,226	3,648,475	2,553,751	
1827.....	7,040,682	6,142,391	898,291	
1828.....	6,681,521	6,608,392	73,129	
1829.....	6,586,946	3,350,762	3,236,184	
1830.....	7,334,818	756,109	6,578,709	
1831.....	6,373,916	6,035,402	338,514	
1832.....	5,190,818	3,606,934	1,583,884	
1833.....	6,458,516	1,722,196	4,736,320	
1834.....	14,145,460	1,386,578	12,758,882	
1835.....	10,806,251	5,122,495	5,683,756	
1836.....	6,169,019	3,676,881	2,492,138	
1837.....	8,084,600	2,762,514	5,322,086	
1838.....	6,072,233	2,294,842	3,777,391	
1839.....	4,430,596	3,976,075	454,521	
1840.....	5,797,656	4,713,641	1,084,015	
1841.....	3,719,184	6,444,463		2,725,279
1842.....	3,329,722	2,508,783	820,939	
June 30—				
1843 a.....	5,253,898	1,113,104	4,140,794	
1844.....	4,217,125	4,087,693	129,432	
1845.....	3,251,392	5,551,070		2,299,678
1846.....	2,867,319	1,852,069	1,015,250	
1847.....	2,546,358	869,103	1,677,255	
1848.....	2,951,529	4,770,419		1,818,890
1849.....	2,582,593	3,432,415		849,822
1850.....	2,852,086	2,962,367		110,281
1851.....	1,884,413	6,635,839		4,751,426
1852.....	1,846,985	2,600,156		753,171
1853.....	1,774,026	2,044,017		269,991
1854.....	3,726,623	727,040	2,999,583	
1855.....	2,567,010	1,138,128	1,428,882	
1856.....	3,217,327	744,508	2,472,819	
1857.....	5,807,163	3,904,269	1,902,894	
1858.....	7,708,428	2,630,343	5,078,085	
Amount carried forward.....	200,011,529	152,976,634	74,601,922	27,567,027

a Nine months.

Value of SILVER COIN and BULLION imported into and exported from the United States, fiscal years since 1821—Continued.

Year ending.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
Amount brought forward.....	\$200,011,529	\$152,976,634	\$74,601,922	\$27,567,027
June 30—				
1859	5,309,392	2,779,358	2,530,034	.....
1860	6,041,349	8,100,200	.....	2,058,851
1861	4,047,681	2,367,107	1,680,574	.....
1862	2,508,041	1,447,737	1,060,304	.....
1863	4,053,567	1,993,773	2,059,794	.....
1864	1,938,843	4,734,907	.....	2,796,064
1865	3,311,844	9,262,193	.....	5,950,349
1866	2,503,831	14,846,762	.....	12,342,931
1867	5,045,609	21,841,745	.....	16,796,136
1868	5,450,925	21,387,758	.....	15,936,833
1869	5,675,308	21,134,882	.....	15,459,574
1870	14,362,229	24,519,704	.....	10,157,475
1871	14,386,463	31,755,780	.....	17,369,317
1872	5,026,231	30,328,774	.....	25,302,543
1873	12,798,490	39,751,859	.....	26,953,369
1874	8,951,769	32,587,985	.....	23,636,216
1875	7,203,924	25,151,165	.....	17,947,241
1876	7,943,972	25,329,252	.....	17,385,280
1877	14,528,180	29,571,863	.....	15,043,683
1878	16,491,099	24,535,670	.....	8,044,571
1879	14,671,052	20,409,827	.....	5,738,775
1880	12,275,914	13,503,894	.....	1,227,980
1881	10,544,238	16,841,715	.....	6,297,477
1882	8,095,336	16,829,599	.....	8,734,263
1883	10,755,242	20,219,445	.....	9,464,203
1884	14,594,945	26,051,426	.....	11,456,481
1885	16,550,627	33,753,633	.....	17,203,006
1886	17,850,307	29,511,219	.....	11,660,912
1887	17,260,191	26,296,504	.....	9,036,313
1888	20,514,232	28,146,510	.....	7,632,278
1889	24,682,380	36,716,783	.....	12,034,403
1890	27,524,147	36,069,602	.....	8,545,455
1891	26,278,916	23,533,551	2,745,365	.....
1892	28,764,734	33,800,562	.....	5,035,828
1893	34,293,999	41,947,812	.....	7,653,813
1894	19,965,713	51,007,072	.....	31,041,359
1895	20,211,179	47,842,968	.....	27,631,789
1896	27,314,015	60,576,273	.....	33,262,258
1897	30,588,438	63,225,273	.....	32,636,835
1898	30,929,451	55,751,597	.....	24,822,146
1899	31,120,518	56,655,335	.....	25,534,817
1900	35,256,302	56,712,275	.....	21,455,973
1901	36,386,521	64,285,180	.....	27,898,659
1902	28,232,254	49,732,390	.....	21,500,136
Total.....	892,250,927	1,435,825,553	84,677,993	628,252,619

AUSTRALASIA.

Value of GOLD COIN and BULLION imported into and exported from Australasia since 1851.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1851		\$4,365,251		\$4,365,251
1852		46,105,221		46,105,221
1853		50,640,799		50,640,799
1854		49,925,424		49,925,424
1855		53,857,556		53,857,556
1856		61,050,243		61,050,243
1857		55,137,445		55,137,445
1858		55,575,430		55,575,430
1859		56,650,927		56,650,927
1860		49,575,036		49,575,036
1861		53,127,581		53,127,581
1862		50,884,124		50,884,124
1863		55,813,889		55,813,889
1864		43,925,029		43,925,029
1865		46,397,211		46,397,211
1866		46,805,997		46,805,997
1867		42,815,467		42,815,467
1868		45,506,642		45,506,642
1869		50,528,870		50,528,870
1870		40,090,227		40,090,227
1871		37,009,733		37,009,733
1872		36,970,801		36,970,801
1873		45,024,858		45,024,858
1874		36,615,546		36,615,546
1875		33,423,122		33,423,122
1876		27,247,534		27,247,534
1877		36,527,949		36,527,949
1878		28,542,023		28,542,023
1879		13,193,081		13,193,081
1880		22,059,845		22,059,845
1881		33,014,336		33,014,336
1882		26,931,211		26,931,211
1883		24,765,619		24,765,619
1884		5,732,737		5,732,737
1885		25,612,390		25,612,390
1886		16,429,304		16,429,304
1887		9,251,217		9,251,217
1888		16,346,574		16,346,574
1889		25,821,649		25,821,649
1890		27,364,330		27,364,330
1891		31,004,472		31,004,472
1892		20,148,254		20,148,254
1893	\$15,216,226	24,431,771		9,215,545
1894		26,106,806		26,106,806
1895		25,300,685		25,300,685
1896		27,828,360		27,828,360
1897	26,848,485	85,620,732		58,772,247
1898		62,839,635		62,839,635
1899		65,326,524		65,326,524
Total	42,064,711	1,855,269,467		1,813,204,756

GREAT BRITAIN AND IRELAND.

Value of GOLD COIN and BULLION imported into and exported from Great Britain and Ireland since 1858.

Year.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1858	\$110,922,748	\$61,157,500	\$49,765,248	.....
1859	108,511,747	87,991,863	20,519,884	.....
1860	61,243,365	76,119,739	.....	\$14,876,374
1861	59,195,799	59,071,387	124,412	.....
1862	96,861,375	77,922,217	18,939,158	.....
1863	93,157,779	74,473,407	18,684,372	.....
1864	82,248,478	64,625,850	17,622,628	.....
1865	70,494,026	41,332,800	29,161,226	.....
1866	114,409,668	62,009,230	52,400,438	.....
1867	76,891,474	38,393,911	38,497,563	.....
1868	83,393,205	61,845,954	21,547,251	.....
1869	67,015,657	41,237,256	25,778,401	.....
1870	91,522,942	48,730,800	42,792,142	.....
1871	105,208,494	100,728,155	4,480,339	.....
1872	89,881,539	96,108,100	.....	6,226,561
1873	100,304,234	92,810,092	7,494,142	.....
1874	87,991,279	51,787,522	36,203,757	.....
1875	112,614,868	90,751,932	21,862,936	.....
1876	114,245,832	80,373,888	33,871,944	.....
1877	75,148,420	99,088,685	.....	23,940,265
1878	101,570,717	72,844,239	28,726,478	.....
1879	65,058,657	85,547,318	.....	20,488,661
1880	46,012,081	57,564,962	.....	11,552,881
1881	48,484,969	75,425,090	.....	26,940,121
1882	69,963,524	58,513,842	11,449,682	.....
1883	37,743,601	34,510,128	3,233,473	.....
1884	52,287,662	58,460,481	.....	6,172,819
1885	65,097,034	58,061,325	7,035,709	.....
1886	65,173,415	67,078,405	.....	1,904,990
1887	48,447,594	45,373,368	3,074,226	.....
1888	76,830,297	72,725,672	4,104,625	.....
1889	87,178,671	70,346,805	16,831,866	.....
1890	114,693,910	69,623,497	45,070,413	.....
1891	147,472,002	117,634,800	29,837,202	.....
1892	103,413,125	75,187,425	28,225,700	.....
1893	120,978,231	94,959,241	26,018,990	.....
1894	134,590,674	76,298,306	58,292,368	.....
1895	176,197,803	104,094,683	72,103,120	.....
1896	119,664,232	146,628,706	.....	26,964,474
1897	150,648,060	149,970,551	677,509	.....
1898	230,260,646	178,101,062	52,159,584	.....
1899	159,544,991	104,907,058	54,637,933	.....
1900	129,379,007	89,531,234	39,847,773	.....
1901	104,060,588	67,961,962	36,098,626	.....
Total.....	4,256,014,420	3,437,910,448	957,171,118	139,067,146

Value of SILVER COIN and BULLION imported into and exported from Great Britain and Ireland since 1858.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1858	\$32,605,861	\$34,366,425		\$1,760,564
1859	71,890,166	85,687,697		13,797,531
1860	50,580,026	48,145,209	\$2,434,817	
1861	32,036,695	46,588,348		14,551,653
1862	57,194,865	64,793,691		7,598,826
1863	52,987,080	51,702,725		1,715,645
1864	52,691,177	47,947,488	4,743,689	
1865	33,951,823	32,114,968	1,836,855	
1866	52,448,694	43,295,070	9,153,624	
1867	39,033,651	31,318,297	7,715,354	
1868	37,551,948	36,555,717	996,231	
1869	32,752,416	38,463,984		5,711,568
1870	51,823,066	43,341,871	8,481,195	
1871	80,403,841	63,568,150	16,835,691	
1872	54,205,851	51,521,368	2,684,483	
1873	63,206,423	47,828,278	15,378,145	
1874	59,849,039	59,429,489	419,550	
1875	49,268,227	43,699,934	5,568,293	
1876	66,078,646	63,013,067	3,065,579	
1877	105,655,676	94,588,861	11,066,815	
1878	56,215,594	57,025,837		810,243
1879	52,494,269	53,561,156		1,066,887
1880	33,087,441	34,360,804		1,273,363
1881	33,585,673	34,084,878		499,205
1882	44,980,695	43,630,382	1,350,313	
1883	46,076,032	45,369,630	706,402	
1884	46,881,403	48,598,733		1,717,330
1885	45,908,639	47,946,155		2,037,516
1886	36,360,731	35,154,131	1,206,600	
1887	37,853,295	37,994,732		141,437
1888	30,240,139	37,060,480		6,820,341
1889	44,700,749	51,907,607		7,206,858
1890	50,541,810	52,866,658		2,324,848
1891	63,663,246	64,993,889		1,330,643
1892	60,222,938	68,495,988		8,273,050
1893	72,912,463	68,219,872	4,692,591	
1894	65,431,903	60,979,318	4,452,585	
1895	60,428,333	52,209,705	8,218,628	
1896	76,043,209	74,182,191	1,861,018	
1897	94,711,400	91,816,411	2,894,989	
1898	77,006,055	76,984,253	21,802	
1899	66,965,858	68,368,714		1,402,856
1900	69,849,780	66,060,694	3,789,086	
1901	61,141,061	58,640,532	2,500,529	
Total	2,403,517,887	2,361,483,387	122,074,864	80,040,364

NOTE.—The imports and exports of gold and silver were not registered at the custom-house before 1858.

INDIA.

Value of GOLD COIN and BULLION imported into and exported from India since 1835.

Fiscal years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1835-36	\$1,622,486	\$16,940	\$1,605,546	
1836-37	2,052,174	9,587	2,042,587	
1837-38	2,251,184	154,355	2,096,829	
1838-39	1,297,073	37,015	1,260,058	
1839-40	1,125,247	22,288	1,102,959	
1840-41	671,012	2,783	668,229	
1841-42	809,591	3,587	806,004	
1842-43	1,033,844	6,229	1,027,615	
1843-44	1,980,850	2,506	1,978,344	
1844-45	3,501,218	45,516	3,455,702	
1845-46	2,686,142	36,450	2,649,692	
1846-47	4,150,341	28,664	4,121,677	
1847-48	5,103,878	47,020	5,056,858	
1848-49	6,821,607	257,097	6,564,510	
1849-50	5,642,940	207,094	5,435,846	
1850-51	5,622,316	9,811	5,612,505	
1851-52	6,515,163	346,324	6,168,839	
1852-53	6,526,532	821,529	5,705,003	
1853-54	5,249,532	84,020	5,165,512	
1854-55	4,295,762	736,939	3,558,823	
1855-56	12,206,900	10,259	12,196,641	
1856-57	10,589,514	412,621	10,176,893	
1857-58	13,772,604	228,779	13,543,825	
1858-59	21,594,310	52,977	21,541,333	
1859-60	20,867,732	18,508	20,849,224	
1860-61	20,645,839	48,042	20,597,797	
1861-62	25,257,767	29,233	25,228,534	
1862-63	33,489,045	162,590	33,326,455	
1863-64	43,434,417	131,912	43,302,505	
1864-65	48,055,743	170,659	47,885,084	
1865-66	31,013,698	3,155,525	27,858,173	
1866-67	22,295,723	3,597,143	18,698,580	
1867-68	23,242,144	810,062	22,432,082	
1868-69	25,193,763	85,768	25,107,995	
1869-70	27,692,321	578,283	27,114,038	
1870-71	13,541,486	2,435,454	11,106,032	
1871-72	17,391,790	41,043	17,350,747	
1872-73	12,761,768	384,496	12,377,272	
1873-74	8,023,918	1,295,311	6,728,607	
1874-75	10,167,256	1,049,709	9,117,547	
1875-76	8,936,648	1,417,358	7,519,290	
1876-77	7,025,824	6,016,755	1,009,069	
1877-78	7,683,847	5,405,698	2,278,149	
1878-79	7,119,933	11,481,159		\$4,361,226
1879-80	9,978,237	1,459,398	8,518,839	
1880-81	17,870,070	82,044	17,788,026	
1881-82	23,633,531	60,383	23,573,148	
1882-83	24,795,464	799,390	23,996,074	
1883-84	26,617,111	33,831	26,583,280	
1884-85	23,252,973	516,997	22,735,976	
1885-86	15,044,974	1,599,152	13,445,822	
1886-87	13,789,410	3,194,823	10,594,587	
1887-88	15,748,251	1,185,343	14,562,908	
1888-89	15,179,040	1,485,031	13,694,009	
1889-90	24,678,152	2,217,780	22,460,372	
1890-91	30,794,441	4,095,894	26,698,547	
1891-92	19,511,366	8,077,234	11,434,132	
1892-93	8,440,331	21,764,013		13,323,679
1893-94	10,207,343	8,127,141	2,080,202	
1894-95	5,697,372	21,833,333		16,135,961
1895-96	16,314,949	8,120,760	8,194,189	
1896-97	14,569,385	7,137,257	7,432,128	
1897-98	23,620,284	7,697,146	15,923,138	
1898-99	28,655,136	7,580,080	21,075,056	
1899-1900	37,143,707	6,515,256	30,628,451	
1900-1901	38,601,142	35,868,975	2,732,167	
1901-1902	26,952,409	20,666,059	6,286,350	
Total.....	1,012,057,963	212,012,418	833,866,411	33,820,866

NOTE.—Rupee calculated at coining rate, \$0.4737, 1835-36 to 1892-93. Rupee calculated at 16 pence= \$0.32443328 (India, act of June 26, 1893) from 1893-94. The Indian coinage act, September 15, 1899, made the sovereign equal to 15 rupees. Rupee=\$0.3244½.

Value of SILVER COIN and BULLION imported into and exported from India since 1835.

Fiscal years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1835-36	\$8,923,570	\$1,079,278	\$7,844,292	
1836-37	8,014,347	1,498,677	6,515,670	
1837-38	10,779,395	1,207,261	9,572,134	
1838-39	13,871,374	998,849	12,872,525	
1839-40	9,426,517	1,394,500	8,032,017	
1840-41	8,309,466	1,488,239	6,821,227	
1841-42	8,166,405	1,921,576	6,244,829	
1842-43	15,743,181	1,375,107	14,368,074	
1843-44	23,085,410	5,101,542	17,983,868	
1844-45	15,456,238	5,778,905	9,677,333	
1845-46	9,252,954	5,006,981	4,245,973	
1846-47	10,156,785	3,449,536	6,707,249	
1847-48	4,487,813	6,892,794		\$2,404,981
1848-49	13,619,523	12,091,909	1,527,614	
1849-50	10,880,481	4,682,473	6,198,008	
1850-51	12,927,847	2,624,372	10,303,475	
1851-52	18,070,677	4,126,417	13,944,260	
1852-53	26,718,190	4,287,840	22,430,350	
1853-54	18,349,834	7,128,931	11,220,903	
1854-55	5,572,809	5,428,761	144,048	
1855-56	42,790,127	2,912,201	39,877,926	
1856-57	59,554,743	5,666,786	53,887,957	
1857-58	63,193,118	3,729,608	59,463,510	
1858-59	40,779,771	3,169,795	37,609,976	
1859-60	58,733,428	4,483,813	54,249,615	
1860-61	31,313,981	5,385,269	25,928,712	
1861-62	47,504,340	3,285,374	44,218,966	
1862-63	66,317,742	5,242,194	61,075,548	
1863-64	68,312,034	6,036,407	62,275,627	
1864-65	55,907,812	6,859,332	49,048,480	
1865-66	98,227,383	7,376,154	90,851,229	
1866-67	42,121,504	8,236,064	33,885,440	
1867-68	34,062,580	6,839,866	27,222,714	
1868-69	48,562,804	6,706,037	41,856,767	
1869-70	40,218,703	4,594,463	35,624,240	
1870-71	12,955,596	8,371,840	4,583,756	
1871-72	38,932,000	7,142,562	31,789,438	
1872-73	9,310,588	5,932,750	3,377,838	
1873-74	20,165,316	8,019,505	12,145,811	
1874-75	29,451,085	6,859,818	22,591,267	
1875-76	16,859,016	929,015	15,930,001	
1876-77	48,628,015	13,594,568	35,033,447	
1877-78	76,776,337	5,354,123	71,422,214	
1878-79	27,221,736	7,898,329	19,323,407	
1879-80	46,742,742	8,444,351	38,298,391	
1880-81	25,871,073	6,927,463	18,943,610	
1881-82	31,468,682	5,291,345	26,177,337	
1882-83	40,674,314	4,271,789	36,402,525	
1883-84	36,053,494	4,882,559	31,170,935	
1884-85	44,288,435	9,072,616	35,215,819	
1885-86	60,277,734	3,794,079	56,483,655	
1886-87	40,001,467	5,177,956	34,823,511	
1887-88	51,535,276	6,623,306	44,911,970	
1888-89	52,197,456	7,198,493	44,998,963	
1889-90	60,288,509	7,059,335	53,229,174	
1890-91	73,109,219	5,961,600	67,147,619	
1891-92	50,229,883	7,491,797	42,738,086	
1892-93	72,135,135	11,200,409	60,934,726	
1893-94	49,680,971	5,173,881	44,507,090	
1894-95	25,384,063	4,852,044	20,532,019	
1895-96	27,050,795	5,698,067	21,352,728	
1896-97	27,876,938	8,879,980	18,996,958	
1897-98	42,981,037	15,493,065	27,487,972	
1898-99	29,376,232	16,462,569	12,913,663	
1899-1900	30,901,915	9,297,916	21,603,999	
1900-1901	41,132,184	10,290,338	30,841,846	
1901-1902	39,885,187	16,549,234	23,335,953	
Total	2,328,855,316	408,284,013	1,922,976,284	2,404,981

NOTE.—Rupee calculated at coining rate, \$0.4737, 1835-36 to 1892-93. Rupee calculated at 16 pence = \$0.32443328 (India, act of June 26, 1893) from 1893-94. The Indian coinage act, September 15, 1899, made the sovereign equal to 15 rupees. Rupee = \$0.32441.

FRANCE.

Value of GOLD COIN and BULLION imported into and exported from France since 1815.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1815-1821 <i>a</i>	\$424, 214, 000	\$522, 837, 000	.....	\$98, 623, 000
1822-1836 <i>a</i>	1, 146, 420, 000	1, 186, 950, 000	.....	40, 530, 000
1837-1852 <i>a</i>	1, 587, 232, 000	1, 198, 144, 000	\$389, 088, 000	.....
1853	61, 525, 891	5, 737, 504	55, 788, 387	.....
1854	92, 774, 135	12, 462, 589	80, 311, 546	.....
1855	73, 515, 630	31, 394, 731	42, 120, 899	.....
1856	89, 745, 193	17, 321, 364	72, 423, 829	.....
1857	109, 757, 556	23, 713, 910	86, 043, 646	.....
1858	106, 837, 852	12, 826, 587	94, 011, 265	.....
1859	140, 274, 330	36, 181, 131	104, 093, 199	.....
1860	90, 802, 254	30, 644, 347	60, 157, 907	.....
1861	47, 099, 141	51, 679, 803	.....	4, 580, 662
1862	77, 552, 611	45, 700, 277	31, 852, 334	.....
1863	71, 358, 469	69, 047, 101	2, 311, 368	.....
1864	89, 551, 228	65, 398, 822	24, 152, 406	.....
1865	80, 944, 200	51, 835, 168	29, 109, 032	.....
1866	156, 967, 479	67, 173, 843	89, 793, 636	.....
1867	114, 570, 976	35, 696, 894	78, 874, 082	.....
1868	95, 234, 885	54, 152, 326	41, 082, 559	.....
1869	87, 737, 028	34, 790, 566	52, 946, 462	.....
1870	59, 896, 006	36, 781, 168	23, 114, 838	.....
1871	27, 765, 366	69, 031, 468	.....	41, 266, 102
1872	27, 379, 173	37, 587, 522	.....	10, 208, 349
1873	33, 889, 642	54, 856, 969	.....	20, 967, 327
1874	99, 789, 685	16, 558, 435	83, 231, 250	.....
1875	117, 346, 702	26, 574, 749	90, 771, 953	.....
1876	115, 473, 251	18, 268, 415	97, 204, 836	.....
1877	103, 196, 521	19, 099, 473	84, 097, 048	.....
1878	70, 324, 568	24, 698, 596	45, 625, 972	.....
1879	37, 443, 737	69, 774, 711	.....	32, 330, 974
1880	37, 605, 278	78, 737, 824	.....	41, 132, 546
1881	45, 059, 710	43, 054, 440	2, 005, 270	.....
1882	54, 703, 341	37, 068, 545	17, 634, 796	.....
1883	12, 462, 010	26, 028, 752	.....	13, 566, 742
1884	24, 598, 043	15, 806, 983	8, 791, 060	.....
1885	47, 018, 553	38, 816, 482	8, 202, 071	.....
1886	50, 354, 659	38, 233, 403	12, 121, 256	.....
1887	17, 982, 216	49, 809, 821	.....	31, 827, 605
1888	19, 514, 968	37, 135, 702	.....	17, 620, 734
1889	65, 161, 124	24, 974, 151	40, 186, 973	.....
1890	22, 528, 197	48, 153, 115	.....	25, 624, 918
1891	69, 462, 638	45, 430, 120	24, 032, 518	.....
1892	74, 379, 010	20, 837, 982	53, 541, 028	.....
1893	58, 890, 873	22, 556, 169	36, 334, 704	.....
1894	88, 538, 554	20, 767, 201	67, 771, 353	.....
1895	48, 872, 298	47, 165, 473	1, 706, 825	.....
1896	58, 249, 195	60, 003, 829	.....	1, 754, 634
1897	56, 745, 469	25, 448, 764	31, 296, 705	.....
1898	38, 470, 692	60, 381, 777	.....	21, 911, 085
1899	61, 527, 238	31, 071, 587	30, 455, 651	.....
1900	87, 416, 381	24, 254, 861	63, 161, 520	.....
1901	82, 798, 158	23, 869, 468	58, 928, 690	.....
Total.....	6, 558, 958, 114	4, 746, 525, 918	2, 214, 376, 874	401, 944, 678

a For the periods.

Value of *SILVER COIN* and *BULLION* imported into and exported from France since 1815.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1815-1821 <i>a</i>	\$60,602,000	\$74,691,000	.....	\$14,089,000
1822-1824 <i>a</i>	79,323,000	9,261,000	\$70,059,000	.....
1825-1829 <i>a</i>	186,824,000	84,534,000	102,290,000	.....
1830-1836 <i>a</i>	200,527,000	71,410,000	129,117,000	.....
1837-1852 <i>a</i>	515,696,000	202,071,000	313,625,000	.....
1853	21,725,817	44,284,622	.....	22,558,805
1854	19,270,664	50,863,606	.....	31,592,942
1855	23,331,963	61,383,843	.....	38,051,880
1856	21,209,928	75,949,167	.....	54,739,239
1857	18,965,917	88,411,177	.....	69,445,260
1858	31,002,555	33,885,975	.....	2,883,420
1859	40,633,641	73,737,580	.....	33,103,939
1860	25,206,765	55,551,664	.....	30,347,899
1861	33,230,740	45,160,649	.....	11,929,909
1862	25,368,885	41,999,888	.....	16,631,003
1863	31,073,000	44,262,813	.....	13,189,813
1864	51,672,276	59,869,758	.....	8,197,482
1865	45,574,441	31,565,343	14,009,098	.....
1866	48,260,036	39,581,791	8,678,245	.....
1867	49,095,533	12,493,276	36,602,257	.....
1868	37,260,001	16,169,926	21,090,075	.....
1869	37,213,102	15,708,077	21,505,025	.....
1870	20,465,720	13,620,589	6,845,131	.....
1871	30,337,863	27,343,082	2,994,781	.....
1872	46,488,682	26,754,432	19,734,250	.....
1873	75,083,562	40,054,448	35,029,114	.....
1874	83,842,095	14,181,833	69,660,262	.....
1875	51,488,926	15,717,920	35,771,006	.....
1876	39,601,863	12,501,575	27,100,288	.....
1877	28,594,108	8,143,828	20,450,280	.....
1878	34,555,492	11,620,530	22,934,962	.....
1879	26,602,927	11,999,968	14,602,959	.....
1880	19,487,017	12,000,933	7,486,084	.....
1881	25,112,195	15,251,246	9,860,949	.....
1882	24,713,071	30,348,092	.....	5,635,021
1883	15,717,920	18,517,192	.....	2,799,272
1884	19,500,720	8,938,602	10,562,118	.....
1885	45,505,290	26,581,143	18,924,147	.....
1886	35,518,423	25,923,836	9,594,587	.....
1887	34,354,592	26,738,827	7,615,765	.....
1888	31,669,988	21,021,915	10,648,073	.....
1889	21,350,913	19,818,847	1,532,066	.....
1890	26,614,436	20,822,832	5,791,604	.....
1891	34,030,365	28,055,497	5,974,868	.....
1892	24,020,020	20,739,863	3,280,157	.....
1893	31,689,656	24,561,540	7,128,116	.....
1894	18,326,887	21,201,693	.....	2,874,806
1895	27,227,348	17,163,361	10,063,987	.....
1896	30,217,696	18,771,262	11,446,434	.....
1897	36,603,944	50,655,735	.....	14,051,791
1898	36,874,144	36,657,513	216,631	.....
1899	36,292,338	42,392,673	.....	6,100,335
1900	28,194,516	39,909,728	.....	11,715,212
1901	18,885,436	27,119,395	.....	8,233,959
Total	2,662,035,417	1,967,982,085	1,092,224,319	398,170,987

a For the periods.

BELGIUM.

Value of GOLD COIN and BULLION imported into and exported from Belgium since 1852.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1852-1855 <i>a</i>	<i>b</i> \$32, 295, 892	<i>b</i> \$44, 691, 920	-----	\$12, 396, 028
1856-1860 <i>a</i>	<i>b</i> 61, 901, 100	<i>b</i> 182, 089, 520	-----	120, 188, 420
1861-1865 <i>a</i>	<i>b</i> 36, 100, 885	<i>b</i> 129, 583, 765	-----	93, 482, 880
1866-1870 <i>a</i>	<i>b</i> 72, 521, 380	<i>b</i> 23, 035, 185	\$49, 486, 195	-----
1871-1875 <i>a</i>	<i>b</i> 192, 250, 550	<i>b</i> 17, 445, 265	174, 805, 285	-----
1876-1880 <i>a</i>	8, 022, 250	896, 295	7, 125, 955	-----
1881.....	250, 740	11, 966	238, 774	-----
1882.....	3, 169, 602	3, 689, 539	-----	519, 937
1883.....	476, 808	3, 227, 608	-----	2, 750, 800
1884.....	1, 302, 424	4, 037, 622	-----	2, 735, 198
1885.....	2, 950, 557	779, 767	2, 170, 790	-----
1886.....	2, 095, 316	522, 993	1, 572, 323	-----
1887.....	764, 845	34, 741	730, 104	-----
1888.....	1, 157, 699	66, 477	1, 091, 222	-----
1889.....	13, 550, 148	466, 673	13, 083, 475	-----
1890.....	9, 202, 507	195, 441	9, 007, 063	-----
1891.....	356, 479	2, 517	353, 962	-----
1892.....	512, 378	10, 534	501, 841	-----
1893.....	516, 675	32, 450	514, 225	-----
1894.....	3, 904, 676	325, 100	3, 579, 576	-----
Total.....	443, 332, 911	411, 145, 381	264, 260, 793	232, 073, 263

a For the periods.

b Gold and silver.

Value of SILVER COIN and BULLION imported into and exported from Belgium since 1852.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1852-1855.....	-----	-----	-----	-----
1856-1860.....	-----	-----	-----	-----
1861-1865.....	-----	-----	-----	-----
1866-1870.....	-----	-----	-----	-----
1871-1875.....	-----	-----	-----	-----
1876-1880 <i>a</i>	\$30, 651, 950	\$3, 763, 675	\$26, 888, 275	-----
1881.....	4, 426, 007	3, 385, 085	1, 040, 922	-----
1882.....	5, 897, 347	433, 119	5, 464, 228	-----
1883.....	16, 850, 216	3, 516, 753	13, 333, 463	-----
1884.....	7, 116, 601	1, 890, 570	5, 226, 031	-----
1885.....	579, 886	62, 731	517, 155	-----
1886.....	2, 595, 119	168, 891	2, 426, 228	-----
1887.....	267, 046	175, 512	91, 534	-----
1888.....	1, 757, 497	760, 231	997, 266	-----
1889.....	10, 391, 231	1, 510, 060	8, 881, 171	-----
1890.....	10, 595, 251	1, 179, 518	9, 415, 733	-----
1891.....	297, 911	13, 823	284, 088	-----
1892.....	333, 179	25, 379	307, 800	-----
1893.....	362, 453	50, 419	312, 034	-----
1894.....	1, 004, 219	3, 864, 205	-----	\$2, 859, 986
Total.....	93, 125, 913	20, 799, 971	75, 185, 928	2, 859, 986

a For the period.

SWITZERLAND.

Value of GOLD COIN and BULLION imported into and exported from Switzerland since 1878.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1878	\$1,861,375	\$1,794,898	\$66,477	.....
1879	2,991,496	864,210	2,127,286	.....
1880	2,858,541	1,528,987	1,329,554	.....
1881	2,127,286	664,778	1,462,508	.....
1882	2,792,063	531,822	2,260,241	.....
1883	4,985,827	1,263,076	3,722,751	.....
1884	2,526,152	132,955	2,393,197	.....
1885 <i>a</i>	5,553,786	6,199,670	.....	\$645,884
1886	2,523,493	1,931,777	591,716	.....
1887	2,949,615	2,234,979	714,636	.....
1888	2,877,819	1,879,324	998,495	.....
1889	6,594,579	1,067,906	5,526,673	.....
1890	6,118,551	1,226,808	4,891,743	.....
1891	2,553,554	1,124,854	1,428,700	.....
1892	4,548,749	1,485,931	3,062,818	.....
1893	4,802,720	2,120,080	2,682,640	.....
1894	9,275,749	4,059,069	5,216,680	.....
1895	7,742,375	4,030,768	3,711,607	.....
1896	3,727,475	5,093,332	.....	1,365,857
1897	9,210,170	4,484,135	4,726,035	.....
1898	8,315,572	4,228,718	4,086,854	.....
1899	8,896,545	6,125,000	2,771,545	.....
1900	8,856,996	4,015,485	4,841,511	.....
1901	13,407,332	4,009,891	9,397,441	.....
Total.....	128,097,820	62,098,453	68,011,108	2,011,741

a Gold and silver.

Value of SILVER COIN and BULLION imported into and exported from Switzerland since 1878.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1878	\$2,985,037	\$1,136,544	\$1,848,493	.....
1879	3,040,792	192,998	2,847,794	.....
1880	5,240,970	471,773	4,769,197	.....
1881	4,880,707	450,329	4,430,378	.....
1882	4,696,286	1,518,251	3,178,035	.....
1883	3,898,561	1,037,901	2,860,660	.....
1884	2,993,615	802,014	2,191,601	.....
1885 .....	.....	.....	.....	.....
1886	5,342,358	3,427,045	1,915,313	.....
1887	6,187,818	3,589,979	2,597,839	.....
1888	6,500,132	3,528,862	2,971,270	.....
1889	8,877,855	2,844,575	6,033,280	.....
1890	8,522,390	3,843,796	4,678,594	.....
1891	10,570,093	6,030,421	4,539,672	.....
1892	7,340,632	5,398,789	1,941,843	.....
1893	8,076,938	8,760,037	.....	\$683,099
1894	6,312,702	6,771,227	.....	458,525
1895	10,835,343	5,025,086	5,810,257	.....
1896	9,787,265	5,531,494	4,255,771	.....
1897	14,523,709	7,423,417	7,100,292	.....
1898	16,657,880	8,307,405	8,350,475	.....
1899	23,114,229	9,113,377	14,000,852	.....
1900	17,888,177	6,371,960	11,516,217	.....
1901	8,429,956	2,278,442	6,151,514	.....
Total.....	196,703,445	93,855,722	103,989,347	1,141,624

ITALY.

Value of GOLD COIN and BULLION imported into and exported from Italy since 1862.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1862 <i>a</i>	\$29,857	\$202,065	.....	\$172,208
1863 <i>a</i>	40,452	77,666	.....	37,214
1864 <i>a</i>	29,805	36,624	.....	6,819
1865 <i>a</i>	6,652	143,484	.....	136,832
1866 <i>a</i>	263,285	905,363	.....	642,078
1867 <i>a</i>	286,002	1,496,472	.....	1,210,470
1868 <i>a</i>	281,329	284,426	.....	3,097
1869 <i>a</i>	291,951	30,309	\$261,642	.....
1870 <i>a</i>	260,668	188,088	72,580	.....
1871 <i>a</i>	432,786	2,097,918	.....	1,665,132
1872 <i>a</i>	791,629	953,115	.....	161,486
1873 <i>a</i>	4,918,051	340,794	4,577,257	.....
1874 <i>a</i>	1,804,050	1,403,096	400,954	.....
1875 <i>a</i>	1,619,190	2,198,594	.....	579,404
1876 <i>a</i>	3,887,505	1,612,785	2,274,720	.....
1877 <i>a</i>	2,841,419	3,709,674	.....	868,255
1878.....	1,517,775	3,945,680	.....	2,427,905
1879.....	1,824,846	6,411,120	.....	4,586,274
1880.....	2,979,063	3,063,200	.....	84,137
1881.....	14,351,731	3,957,098	10,394,633	.....
1882.....	12,344,261	222,934	12,121,327	.....
1883.....	8,120,475	1,616,124	6,504,351	.....
1884.....	3,942,758	2,271,243	1,671,515	.....
1885.....	2,257,849	19,558,195	.....	17,300,346
1886.....	2,063,595	1,798,760	264,835	.....
1887.....	1,500,479	4,705,456	.....	3,204,977
1888.....	1,432,639	4,372,936	.....	2,940,297
1889.....	3,086,186	3,515,090	.....	428,904
1890.....	1,913,325	3,817,212	.....	1,903,887
1891.....	2,316,000	3,184,500	.....	868,500
1892.....	4,173,109	6,710,037	.....	2,536,928
1893.....	2,899,208	14,954,167	.....	12,054,959
1894.....	3,579,320	4,578,867	.....	999,547
1895.....	1,030,427	3,262,472	.....	2,232,045
1896.....	1,106,006	2,748,610	.....	1,642,604
1897.....	670,521	1,655,052	.....	984,531
1898.....	346,550	2,407,868	.....	2,061,318
Total.....	91,240,754	114,437,094	38,543,814	61,740,154

a Gold and silver.

Value of SILVER COIN and BULLION imported into and exported from Italy since 1878.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1878.....	\$737,937	\$5,067,962	.....	\$4,330,025
1879.....	997,378	375,020	\$622,358	.....
1880.....	4,638,937	2,498,174	2,140,763	.....
1881.....	3,654,990	1,442,156	2,212,834	.....
1882.....	10,703,056	985,155	9,717,901	.....
1883.....	10,037,549	1,919,564	8,117,985	.....
1884.....	1,091,724	3,713,730	.....	2,622,006
1885.....	20,414,016	16,822,841	3,591,175	.....
1886.....	8,809,527	8,845,808	.....	36,281
1887.....	15,676,915	16,622,411	.....	945,496
1888.....	11,504,228	10,194,453	1,309,775	.....
1889.....	6,489,085	7,111,124	.....	622,039
1890.....	9,212,739	9,047,222	165,517	.....
1891.....	8,163,900	8,916,600	.....	752,700
1892.....	10,653,251	12,233,135	.....	1,579,884
1893.....	8,920,296	6,901,927	2,018,369	.....
1894.....	17,358,980	4,433,107	12,925,873	.....
1895.....	432,127	1,655,940	.....	1,223,813
1896.....	1,045,445	1,717,291	.....	671,846
1897.....	1,137,785	3,816,249	.....	2,678,464
1898.....	318,103	2,754,443	.....	2,436,340
Total.....	151,997,968	127,074,312	42,822,550	17,898,894

NOTE.—From 1862 to 1878 silver was included with gold in the reports.

PORTUGAL.

Value of GOLD COIN and BULLION imported into and exported from Portugal since 1869.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1869	\$325,712	\$136,358	\$189,354	
1870	1,232,768	74,264	1,158,504	
1871	3,878,716	48,197	3,830,519	
1872	1,938,875	2,829	1,936,046	
1873	4,221,064	35,527	4,185,537	
1874	1,565,302	42,963	1,522,339	
1875	2,693,037	71,771	2,621,266	
1876	4,671,243	1,786,325	2,884,918	
1877	779,127	1,520,681		\$741,554
1878	3,513,650	1,823,424	1,690,226	
1879 <i>a</i>	1,343,520	2,838,240		1,494,720
1880	2,779,705	30,489	2,749,216	
1881 <i>a</i>	3,248,640	135,000	3,113,640	
1882	2,956,220	2,795,667	160,553	
1883	21,044,050	2,425,351	18,618,729	
1884	2,932,122	295,764	2,636,358	
1885 <i>a</i>	4,177,000	847,000	3,330,000	
1886	9,448,364	3,737	9,444,627	
1887	4,762,970	3,123	4,759,847	
1888	4,866,877	572,297	4,294,580	
1889	10,844	2,037	8,807	
1890	15,878,704	11,284,488	4,594,216	
1891	4,018,788	462,988	3,555,800	
1892	1,596,114	9,805,793		8,209,679
1893	1,010,664	6,237,108		5,226,444
1894	3,830	3,891		61
1895	979,274	2,267,537		1,288,263
1896	15,120,000	3,456,000	11,664,000	
1897	18,258	37,794		19,536
1898	70,391	1,101,225		1,030,834
1899	2,553	1,026,233		1,023,680
1900	63,288	1,307,988		1,244,700
Total	121,151,700	52,482,089	88,949,082	20,279,474

a Gold and silver.

Value of SILVER COIN and BULLION imported into and exported from Portugal since 1869.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1869	\$7,747	\$371,232		\$363,485
1870	2,984	244,858		241,874
1871	33,026	129,078		96,052
1872	346	41,891		41,545
1873	24,632	39,701		15,069
1874	62,387	76,842		14,455
1875	47,537	54,607		7,070
1876	173,774	30,467	\$143,307	
1877	63,818	111,718		47,900
1878	362,572	216,391	146,181	
1879				
1880	47,181	33,035	14,146	
1881				
1882	66,006	16,417	49,589	
1883	500,713	107,888	392,825	
1884	79,669	23,869	55,800	
1885				
1886	637,189	3,886	633,303	
1887	338,959	2,118	336,841	
1888	99,936	102,948		3,012
1889	487	109	378	
1890	495,720	204,984	290,736	
1891	4,911,840	5,338,440		426,600
1892	2,465,264	271,793	2,193,471	
1893		166,536		166,536
1894	298	302		4
1895	255,199	218,933	36,266	
1896	1,537,920		1,537,920	
1897	175,094	<i>a</i> 1,651,148		1,476,054
1898	1,579,349	458,175	1,121,174	
1899	967,441	287,245	680,196	
1900	457,596		457,596	
Total	15,394,684	10,204,614	8,089,729	2,899,656

a Gold and silver not separated.

NOTE.—1879-1881 and 1885, silver was included with gold in the reports.

AUSTRIA-HUNGARY.

Value of GOLD COIN and BULLION imported into and exported from Austria-Hungary since 1859.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1859	\$13,358,460	\$9,768,955	\$3,589,505	
1860	6,933,771	8,345,382		\$1,411,611
1861	6,646,000	6,124,289	521,711	
1862	7,500,011	8,090,176		590,165
1863	10,498,022	8,199,170	2,298,852	
1864	5,677,013	5,940,195		263,182
1865	4,252,111	4,644,889		392,778
1866	6,284,458	5,027,699	1,256,759	
1867	8,491,594	4,383,702	4,107,892	
1868	7,672,142	2,662,388	5,009,754	
1869	13,313,267	3,946,395	9,366,872	
1870	16,115,885	7,217,556	8,898,329	
1871	26,986,083	9,710,471	17,275,612	
1872	15,656,646	5,930,225	9,726,421	
1873	12,380,169	2,108,111	10,272,058	
1874	4,699,387	296,412	4,402,975	
1875	1,998,452	1,609,661	388,791	
1876	10,285,350	2,845,817	7,439,533	
1877	8,671,036	2,758,755	5,912,281	
1878	6,760,976	1,860,880	4,900,096	
1879	10,454,823	1,452,816	9,002,007	
1880	10,562,488	1,516,617	9,045,871	
1881	9,412,065	998,220	8,413,845	
1882	8,411,178	1,995,129	6,416,049	
1883	6,420,701	968,322	5,452,379	
1884	4,745,244	1,384,362	3,360,882	
1885	3,833,413	1,935,980	1,897,433	
1886	3,156,850	451,263	2,705,587	
1887	3,329,646	1,497,344	1,832,302	
1888	10,559,829	4,533,237	6,026,592	
1889	9,958,366	3,468,547	6,489,819	
1890	18,973,001	1,733,941	17,239,060	
1891	17,149,500	4,072,418	13,077,082	
1892	30,107,622	1,153,446	28,954,176	
1893	68,933,160	6,291,269	62,641,891	
1894	22,292,000	18,951,806	3,340,194	
1895	27,645,892	11,617,791	16,028,101	
1896	24,711,754	13,672,619	11,039,135	
1897	42,637,823	20,412,091	22,225,732	
1898	10,663,773	24,984,689		14,320,916
1899	8,585,992	14,245,490		5,659,498
1900	12,918,193	13,629,182		710,989
1901	35,731,855	7,585,753	28,146,102	
Total	595,376,001	260,023,460	358,701,680	23,349,139

Value of SILVER COIN and BULLION imported into and exported from Austria-Hungary since 1859.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1859	\$17,324,743	\$22,440,114		\$5,115,371
1860	9,300,505	16,127,316		6,826,811
1861	7,386,002	7,573,146		187,144
1862	4,576,629	6,358,763		1,782,134
1863	5,128,338	3,697,136	\$1,431,202	
1864	3,229,170	6,193,978		2,964,808
1865	6,416,116	3,637,996	2,778,120	
1866	7,067,029	18,568,343		11,501,314
1867	4,544,544	5,856,469		1,311,925
1868	8,599,096	5,659,682	2,939,414	
1869	6,814,801	2,782,691	4,032,110	
1870	4,621,514	6,210,934		1,589,420
1871	4,225,114	11,361,133		7,136,019
1872	3,148,004	20,579,681		17,431,677
1873	8,224,807	10,153,939		1,929,132
1874	5,130,042	7,379,934		2,249,892
1875	4,950,710	5,693,304		742,594
1876	6,922,317	12,946,813		6,024,496
1877	5,619,826	4,780,771	839,055	
1878	18,478,532	5,524,363	12,954,169	
1879	20,774,473	2,687,560	18,086,913	
1880	3,615,928	8,231,457		4,615,529
1881	7,905,793	651,495	7,254,298	
1882	1,562,781	23,157,024		21,594,243
1883	3,186,613	96,627	3,089,986	
1884	882,859	2,737,890		1,855,031
1885	1,611,073	1,870,907		259,834
1886	1,354,690	12,842	1,341,848	
1887	1,348,456	467,924	880,532	
1888	1,524,255	404,379	1,119,876	
1889	2,040,721	55,940	1,984,781	
1890	1,329,588	44,511	1,285,077	
1891	1,852,808	974,604	878,204	
1892	3,699,472	1,738,086	1,961,386	
1893	3,699,668	1,865,102	1,834,566	
1894	4,729,927	3,073,648	1,656,279	
1895	1,395,736	1,097,257	298,479	
1896	3,032,310	3,470,300		437,990
1897	2,205,065	2,352,442		147,377
1898	434,100	541,351		107,251
1899	686,683	1,738,235		1,051,552
1900	1,066,691	2,246,907		1,180,216
1901	993,975	1,263,382		269,407
Total	212,641,504	244,306,376	66,646,295	98,311,167

NOTE.—The above is at United States silver-dollar coining rate.

GERMANY.

Value of GOLD COIN and BULLION imported into and exported from Germany since 1872.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1872	\$8,396,640	\$24,247,440	.....	\$15,850,800
1873	84,252,000	12,598,530	\$71,653,470	.....
1874	4,176,900	8,353,800	.....	4,176,900
1875	3,665,200	6,664,000	.....	2,998,800
1876	20,991,600	5,331,200	15,660,400	.....
1877	17,374,000	11,067,000	6,307,000	.....
1878	40,126,800	333,200	39,793,600	.....
1879	20,658,400	1,332,800	19,325,600	.....
1880	4,962,300	7,064,554	.....	2,102,254
1881	3,350,564	10,863,510	.....	7,512,946
1882	6,816,558	9,335,788	.....	2,519,230
1883	4,963,252	10,027,416	.....	5,064,164
1884	4,384,912	7,873,754	.....	3,488,842
1885	10,127,138	5,837,664	4,289,474	.....
1886	11,152,204	5,522,790	5,629,414	.....
1887	13,193,054	3,993,878	9,199,176	.....
1888	31,943,646	23,868,544	8,075,102	.....
1889	17,375,404	13,678,146	3,697,258	.....
1890	26,471,145	10,816,886	15,654,259	.....
1891	56,647,846	31,689,457	24,958,389	.....
1892	45,612,162	38,897,709	6,714,453	.....
1893	35,551,259	24,175,031	11,376,228	.....
1894	74,130,690	12,689,947	61,440,743	.....
1895	23,193,328	19,574,609	3,618,719	.....
1896	52,421,909	47,000,480	5,421,429	.....
1897	36,822,654	28,239,437	8,583,217	.....
1898	77,637,405	52,780,811	24,856,594	.....
1899	64,563,395	32,307,398	32,255,997	.....
1900	57,415,834	27,098,680	30,317,154	.....
1901	61,126,228	12,278,509	48,847,719	.....
Total.....	919,504,427	505,542,968	457,675,395	43,713,936

Value of SILVER COIN and BULLION imported into and exported from Germany since 1872.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1872	\$40,698,000	\$17,157,420	\$23,540,580	.....
1873	35,057,400	31,915,800	3,141,600	.....
1874	12,052,320	17,080,308	.....	\$5,027,988
1875	7,216,160	9,253,440	.....	2,037,280
1876	5,483,520	8,409,492	.....	2,925,972
1877	7,106,680	4,678,128	2,428,552	.....
1878	9,520,000	6,645,912	2,874,088	.....
1879	7,794,500	9,567,600	.....	1,773,100
1880	4,366,348	5,017,992	.....	651,644
1881	3,142,790	4,165,714	.....	1,022,924
1882	1,551,284	3,418,156	.....	1,866,872
1883	1,502,018	4,917,556	.....	3,415,538
1884	1,356,838	7,468,202	.....	6,111,364
1885	710,906	4,618,866	.....	3,907,960
1886	2,310,980	10,141,894	.....	7,830,914
1887	2,060,842	9,063,278	.....	7,002,436
1888	2,603,958	11,056,290	.....	8,452,332
1889	2,254,669	13,934,329	.....	11,679,660
1890	3,141,743	13,442,240	.....	10,300,497
1891	4,056,672	13,166,707	.....	9,110,035
1892	3,904,687	3,029,225	875,462	.....
1893	2,464,328	11,894,183	.....	9,429,855
1894	4,251,407	8,450,850	.....	4,199,443
1895	2,389,088	5,547,817	.....	3,158,729
1896	3,163,429	7,260,925	.....	4,097,496
1897	3,177,552	7,670,089	.....	4,492,537
1898	2,657,135	7,445,693	.....	4,788,558
1899	2,310,815	5,920,626	.....	3,609,811
1900	3,979,122	6,392,204	.....	2,413,082
1901	4,479,537	6,981,803	.....	2,502,266
Total.....	186,764,728	275,712,739	32,860,282	121,808,293

NETHERLANDS.

Value of GOLD COIN and BULLION imported into and exported from the Netherlands since 1851.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1851-1855 <i>a</i>	<i>b</i> \$22, 655, 250	<i>b</i> \$20, 375, 265	\$2, 279, 985	.....
1856-1860 <i>a</i>	<i>b</i> 34, 469, 490	26, 990, 020	7, 479, 470	.....
1861-1865 <i>a</i>	<i>b</i> 26, 803, 655	<i>b</i> 36, 969, 725	.....	\$10, 166, 070
1866-1870 <i>a</i>	<i>b</i> 42, 527, 210	<i>b</i> 26, 139, 410	16, 387, 800	.....
1871-1875 <i>a</i>	<i>b</i> 50, 747, 505	<i>b</i> 18, 602, 135	32, 145, 370	.....
1876-1880 <i>a</i>	22, 539, 255	4, 538, 920	18, 000, 335	.....
1881.....	2, 668, 641	3, 183, 004	.....	514, 363
1882.....	4, 014, 018	1, 852, 411	2, 161, 607	.....
1883.....	11, 393, 703	308, 645	11, 085, 058	.....
1884.....	5, 658, 021	805, 809	4, 852, 212	.....
1885.....	6, 595, 534	421, 963	6, 173, 571	.....
1886.....	11, 212, 074	770, 212	10, 441, 862	.....
1887.....	1, 248, 992	603	1, 248, 389	.....
1888.....	3, 766, 457	5, 553, 435	.....	1, 786, 978
1889.....	988, 855	822, 894	165, 961	.....
1890.....	2, 623, 952	228, 158	2, 395, 794	.....
1891.....	3, 707, 284	891, 636	2, 815, 648	.....
1892.....	852, 155	97, 464	754, 691	.....
1893.....	7, 044, 546	943, 333	6, 101, 213	.....
1894.....	3, 258, 790	263, 713	2, 995, 077	.....
1895.....	1, 385, 000	305, 124	1, 079, 876	.....
1896.....	1, 956, 695	84, 098	1, 872, 597	.....
1897.....	8, 568, 577	33, 338	8, 535, 239	.....
1898.....	12, 645, 380	427, 908	12, 217, 472	.....
1899.....	3, 789, 213	2, 911, 336	877, 877	.....
1900.....	6, 757, 901	733, 004	6, 024, 897	.....
1901.....	4, 207, 059	691, 806	3, 515, 253	.....
Total.....	304, 085, 212	154, 945, 369	161, 607, 254	12, 467, 411

a For the periods.

b Gold and silver.

Value of SILVER COIN and BULLION imported into and exported from the Netherlands since 1851.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1851-1855.....	.....	.....	.....	.....
1856-1860.....	.....	.....	.....	.....
1861-1865.....	.....	.....	.....	.....
1866-1870.....	.....	.....	.....	.....
1871-1875.....	.....	.....	.....	.....
1876-1880 <i>a</i>	\$13, 273, 625	\$8, 520, 980	\$4, 752, 645	.....
1881.....	976, 851	19, 507	957, 344	.....
1882.....	1, 061, 238	26, 745	1, 034, 493	.....
1883.....	926, 065	111, 256	814, 809	.....
1884.....	706, 709	425, 125	281, 584	.....
1885.....	950, 119	286, 444	663, 675	.....
1886.....	572, 811	11, 619	561, 192	.....
1887.....	309, 492	47, 430	262, 062	.....
1888.....	387, 338	1, 631, 316	.....	\$1, 243, 978
1889.....	264, 797	6, 668, 657	.....	6, 403, 860
1890.....	551, 823	3, 083, 943	.....	2, 532, 120
1891.....	4, 802, 292	625, 512	4, 176, 780	.....
1892.....	5, 255, 793	2, 241, 753	3, 014, 040	.....
1893.....	951, 392	318, 143	633, 249	.....
1894.....	2, 466, 758	630, 403	1, 836, 355	.....
1895.....	1, 128, 351	22, 310	1, 106, 041	.....
1896.....	639, 381	247, 981	391, 400	.....
1897.....	1, 058, 263	3, 922	1, 054, 341	.....
1898.....	502, 864	640, 320	.....	137, 456
1899.....	379, 277	3, 305, 086	.....	2, 925, 809
1900.....	298, 235	742, 691	.....	444, 456
1901.....	3, 278, 008	889, 557	2, 388, 451	.....
Total.....	40, 741, 485	30, 500, 700	23, 928, 464	13, 687, 679

a For the period.

SPAIN.

Value of GOLD and SILVER COIN and BULLION imported into and exported from Spain since 1871.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1871	\$20,765,642	\$1,648,799	\$19,116,843	
1872	20,538,288	482,886	20,055,402	
1873	20,342,972	1,229,796	19,113,176	
1874	12,228,866	1,245,236	10,983,630	
1875	17,800,197	832,988	16,967,209	
1876	2,318,123	820,636	1,497,487	
1877	9,505,250	402,019	9,103,231	
1878	7,504,226	441,198	7,063,028	
1879	6,577,247	590,773	5,986,474	
1880	17,241,848	2,458,048	14,783,800	
1881	2,021,289	1,252,570	768,719	
1882	7,896,981	1,370,879	6,526,102	
1883	9,502,355	1,399,057	8,103,298	
1884	8,718,196	458,375	8,259,821	
1885	5,243,810	1,888,119	3,355,691	
1886	12,131,787	509,327	11,622,460	
1887	3,861,158	886,642	2,974,516	
1888	546,383	820,250		\$273,867
1889	2,611,869	2,555,706	56,163	
1890	8,359,988	1,027,918	7,332,070	
1891	22,661,095	4,028,875	18,632,220	
1892	8,948,997	8,380,253	568,744	
1893	5,026,068	2,528,135	2,497,933	
1894	4,866,595	690,223	4,176,372	
1895	4,680,687	8,142,978		3,462,291
1896	19,659,369	23,892,671		4,233,302
1897	26,984,769	32,931,362		5,946,593
1898	13,730,792	4,121,534	9,609,258	
1899	14,808,815	4,038,695	10,770,120	
1900	1,065,221	4,063,570		2,998,349
Total	318,148,883	115,139,518	219,923,767	16,914,402

SCANDINAVIAN UNION.

Value of GOLD and SILVER COIN and BULLION imported into and exported from Norway, Sweden, and Denmark since 1871.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1871 a	\$2,896,008	\$558,780	\$2,337,228	
1872 a	3,461,220	30,284	3,430,936	
1873 a	7,014,364	4,843,832	2,170,532	
1874 a	3,424,772	2,234,584	1,190,188	
1875	5,966,484	3,348,928	2,617,556	
1876	10,659,432	10,956,644		\$297,212
1877	6,223,496	4,402,007	1,821,489	
1878	6,982,472	3,091,916	3,890,556	
1879	9,207,944	5,361,876	3,846,068	
1880	7,203,572	2,399,940	4,803,632	
1881	4,036,884	3,252,448	784,436	
1882	3,152,484	2,179,108	973,376	
1883	4,043,852	1,836,068	2,207,784	
1884	2,927,096	1,079,236	1,847,860	
1885	2,379,481	1,813,154	566,327	
1886	2,519,987	322,813	2,197,174	
1887 b	4,959,684	2,387,880	2,571,804	
1888 b	1,656,650	705,486	951,164	
1889	2,911,368	1,353,802	1,557,566	
1890	1,374,770	746,136	628,634	
1891	1,966,988	933,893	1,033,095	
1892	1,672,238	389,821	1,282,417	
1893	657,388	953,819		296,431
1894	3,073,305	781,238	2,292,067	
1895	3,329,967	654,459	2,675,508	
1896	780,620	1,407,293		626,673
1897	2,956,106	92,743	2,863,363	
1898	5,099,397	627,724	4,471,673	
1899	1,501,952	1,365,933	136,019	
1900	357,445	900,078		542,633
1901	2,322,175		2,322,175	
Total	116,719,601	61,011,923	57,470,627	1,762,949

RUSSIA.

Value of GOLD COIN and BULLION imported into and exported from Russia since 1871.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1871	\$4,897,071	\$13,013,320		\$8,116,249
1872	6,260,070	4,992,774	\$1,267,296	
1873	1,929,500	11,043,686		9,114,186
1874	5,056,834	13,162,277		8,105,443
1875	1,328,268	21,283,157		19,954,889
1876	1,148,438	78,603,971		77,455,533
1877	7,257,235	10,490,306		3,233,071
1878	7,910,178	5,252,871	2,657,307	
1879	5,702,058	4,493,420	1,208,638	
1880	5,438,103	19,971,097		14,532,994
1881	4,145,338	51,652,715		47,507,377
1882	3,464,610	52,957,057		49,492,447
1883	2,326,205	14,827,822		12,501,617
1884	1,861,582	3,884,469		2,022,887
1885	1,921,010	4,118,325		2,197,315
1886	1,853,092	11,031,337		9,178,245
1887	1,691,014	14,579,302		12,888,288
1888	16,213,203	27,013,772		10,800,569
1889	2,074,598	13,468,682		11,394,084
1890	12,195,212	13,054,997		859,785
1891	55,818,120	475,429	55,342,691	
1892	89,497,054	195,956	89,301,098	
1893	10,225,426	134,454	10,090,972	
1894	84,527,216	29,085,329	55,441,887	
1895	19,486,233	185,070	19,301,163	
1896	69,720,678	180,715	69,539,963	
1897	71,871,436	3,084,139	68,787,297	
1898	52,154,937	185,070	51,969,867	
1899	25,532,051	27,771,673		2,239,622
1900	2,635,576	59,877,804		57,242,228
1901	4,460,206	34,874,304		30,414,098
Total	580,602,552	544,945,300	424,908,179	389,250,927

Value of SILVER COIN and BULLION imported into and exported from Russia since 1871.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1871	\$830,457	\$628,245	\$202,212	
1872	3,803,430	969,381	2,834,049	
1873	13,932,534	273,989	13,658,545	
1874	7,778,200	341,136	7,437,064	
1875	3,642,896	354,256	3,288,640	
1876	3,038,577	1,087,466	1,951,111	
1877	1,193,975	4,367,616		\$3,173,641
1878	4,842,273	5,672,730		830,457
1879	5,697,428	3,369,679	2,327,749	
1880	4,124,499	2,240,535	1,883,964	
1881	3,530,985	1,592,223	1,938,762	
1882	4,078,963	9,110,327		5,031,364
1883	2,732,944	2,115,504	617,440	
1884	2,654,220	1,779,771	874,449	
1885	3,323,371	2,479,793	843,578	
1886	3,669,137	1,880,877	1,788,260	
1887	3,143,541	2,235,133	908,408	
1888	1,471,051	3,127,334		1,656,283
1889	6,541,777	2,333,151	4,208,626	
1890	5,693,569	3,101,864	2,591,705	
1891	8,145,577	4,131,445	4,014,132	
1892	9,019,503	4,157,443	4,862,060	
1893	17,570,074	6,190,134	11,379,940	
1894	19,076,853	5,844,742	13,232,111	
1895	21,536,271	1,762,512	19,773,759	
1896	41,498,492	2,708,233	38,790,259	
1897	76,659,089	7,333,495	69,325,594	
1898	15,336,033	2,262,788	13,073,245	
1899	16,396,290	1,038,307	15,357,983	
1900	14,891,366	9,233,264	5,658,101	
1901	4,818,854	1,905,930	2,912,924	
Total	330,672,229	95,629,300	245,734,670	10,691,745

JAPAN.

Value of GOLD COIN and BULLION imported into and exported from Japan since 1872.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1872	\$129,951	\$2,684,786		\$2,554,835
1873	2,013,907	2,614,055		600,148
1874	2,700	8,126,290		8,123,590
1875	26,515	10,603,345		10,576,830
1876	621,464	5,872,356		5,250,892
1877	162,280	6,221,776		6,059,496
1878	242	4,601,083		4,600,841
1879	913,392	5,694,814		4,781,422
1880	137,934	7,030,479		6,892,545
1881	468,530	2,699,941		2,231,411
1882	530,132	1,489,983		959,851
1883	564,212	1,211,483		647,271
1884	326,600	1,708,384		1,381,784
1885	608,919	599,539	\$9,380	
1886	1,165,237	377,149	788,088	
1887	1,259,527	111,874	1,147,653	
1888	1,203,253	450,285	752,968	
1889	749,923	268,010	481,913	
1890	360,243	1,687,605		1,327,362
1891	283,144	230,446	52,698	
1892	395,493	8,544,523		8,149,030
1893	496,730	2,302,678		1,805,948
1894	555,966	3,547,138		2,991,172
1895	1,029,912	2,791,952		1,762,040
1896	10,217,458	1,996,575	8,220,883	
1897	32,156,796	4,431,899	27,724,897	
1898	18,456,372	23,068,797		4,612,425
1899	10,009,163	4,370,565	5,638,598	
1900	4,469,252	25,797,991		21,328,739
1901	5,308,563	5,720,562		411,999
Total	94,623,810	146,856,363	44,817,078	97,049,631

Value of SILVER COIN and BULLION imported into and exported from Japan since 1872.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1872	\$3,695,570	\$2,976,127	\$719,443	
1873	1,066,635	2,508,862		\$1,442,227
1874	1,069,041	5,688,911		4,619,870
1875	271,806	4,060,626		3,788,820
1876	7,545,776	4,803,344	2,742,432	
1877	2,011,217	3,219,494		1,208,277
1878	2,188,858	2,727,569		538,711
1879	2,414,046	8,029,229		5,615,183
1880	3,670,515	7,334,822		3,664,307
1881	1,902,506	5,243,660		3,341,154
1882	6,515,345	3,184,162	3,331,183	
1883	6,016,878	2,146,995	3,869,883	
1884	5,930,581	3,581,418	2,349,163	
1885	8,031,835	3,763,809	4,268,026	
1886	9,382,875	9,323,906	58,969	
1887	9,743,844	10,949,251		1,205,407
1888	7,529,239	7,383,159	146,080	
1889	13,423,322	4,920,519	8,502,803	
1890	840,364	12,090,926		11,250,562
1891	13,605,382	1,222,518	12,382,864	
1892	22,488,264	1,185,230	21,303,034	
1893	10,689,757	9,986,510	703,247	
1894	26,227,687	30,831,973		4,604,286
1895	4,844,252	24,509,747		19,665,495
1896	28,924,750	9,602,307	19,322,443	
1897	8,576,610	5,147,733	3,428,877	
1898	2,759,417	20,289,853		17,530,436
1899	41,274	1,199,200		1,157,926
1900	1,271,237	2,464,809		1,193,572
1901	154,255	1,281,509		1,127,254
Total	212,833,138	211,658,178	83,128,447	81,953,487

CHINA.

Value of GOLD COIN and BULLION imported into and exported from China since 1881.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1881	\$32,812,230	\$19,935,880	\$12,876,350	.....
1882	32,197,337	21,424,176	10,773,161	.....
1883	34,653,579	29,756,403	4,897,176	.....
1884	7,349,653	21,132,426	.....	\$13,782,773
1885	63,599,002	115,539,656	.....	51,940,654
Total	170,611,801	207,788,541	28,546,687	65,723,427

Value of SILVER COIN and BULLION imported into and exported from China since 1881.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1881	\$33,119,846	\$24,725,684	\$8,394,162	.....
1882	51,809,679	37,342,013	14,467,666	.....
1883	30,473,767	23,241,947	7,231,820	.....
1884	34,514,153	24,133,372	10,380,781	.....
1885	27,700,467	31,278,347	.....	\$6,577,880
Total	177,617,912	143,721,363	40,474,429	6,577,880

NOTE.—The above is United States silver-dollar coining value.

MEXICO.

Value of GOLD and SILVER COIN and BULLION imported into and exported from Mexico since 1879.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1879	\$21,835,872	.....	\$21,835,872
1880	22,388,576	.....	22,388,576
1881	19,567,141	.....	19,567,141
1882	17,337,024	.....	17,337,024
1883	30,103,064	.....	30,103,064
1884	34,008,568	.....	34,008,568
1885	34,314,384	.....	34,314,384
1886	30,384,496	.....	30,384,496
1887	34,097,976	.....	34,097,976
1888	31,502,096	.....	31,502,096
1889	39,405,560	.....	39,405,560
1890	41,847,008	.....	41,847,008
1891	20,912,328	.....	20,912,328
1892	49,250,763	.....	49,250,763
1893	51,769,745	.....	51,769,745
1894	47,320,215	.....	47,320,215
1895	56,781,075	.....	56,781,075
1896	44,919,693	.....	44,919,693
1897	77,877,391	.....	77,877,391
1898	1,189,174	74,999,509	.....	73,810,335
1899	65,533,961	.....	65,533,961
1900	86,933,639	.....	86,933,639
1901	2,279,875	60,028,200	.....	57,748,325
Total	3,469,049	993,118,287	.....	989,649,238

NOTE.—The above is United States silver-dollar coinage value.

ARGENTINA.

Value of GOLD and SILVER COIN and BULLION imported into and exported from Argentina since 1881.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1881	\$4, 180, 324	\$3, 007, 497	\$1, 172, 827	.....
1882	2, 700, 908	2, 238, 590	462, 318	.....
1883	2, 369, 986	4, 774, 037	.....	\$2, 404, 051
1884	4, 778, 903	4, 389, 583	389, 320	.....
1885	6, 136, 657	8, 219, 519	.....	2, 082, 862
1886	20, 084, 046	8, 136, 788	11, 947, 258	.....
1887	9, 489, 675	9, 611, 338	.....	121, 663
1888	43, 613, 573	8, 501, 776	35, 111, 797	.....
1889	11, 436, 275	27, 670, 919	.....	16, 234, 644
1890	7, 088, 401	775, 529	6, 312, 872	.....
1891	9, 007, 891	1, 659, 476	7, 348, 415	.....
1892	6, 510, 898	1, 971, 477	4, 536, 421	.....
1893	4, 524, 885	1, 910, 700	2, 614, 185	.....
1894	3, 186, 952	264, 067	2, 922, 885	.....
1895	4, 730, 000	119, 000	4, 611, 000	.....
1896	6, 063, 345	2, 179, 000	3, 884, 345	.....
1897	671, 000	4, 949, 000	.....	4, 278, 000
1898	7, 298, 901	1, 572, 772	5, 726, 129	.....
1899	10, 202, 854	3, 526, 032	6, 676, 822	.....
1899	10, 202, 854	3, 526, 032	6, 676, 822	.....
1900	2, 383, 120	2, 376, 270	6, 850	.....
Total	166, 458, 594	97, 856, 370	93, 723, 444	25, 121, 220

CHILE.

Value of GOLD and SILVER COIN and BULLION imported into and exported from Chile since 1873.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1873	\$1, 547, 547	\$5, 007, 629	.....	\$3, 460, 082
1874	126, 529	4, 326, 319	.....	4, 199, 790
1875	345, 522	6, 535, 710	.....	6, 190, 188
1876	330, 922	5, 061, 160	.....	4, 730, 238
1877	321, 189	1, 771, 406	.....	1, 450, 217
1878	180, 060	1, 854, 137	.....	1, 674, 077
1879	53, 531	2, 501, 381	.....	2, 447, 850
1880	43, 799	4, 676, 707	.....	4, 632, 908
1881	116, 796	2, 949, 099	.....	2, 832, 303
1882	29, 199	3, 990, 530	.....	3, 961, 331
1883	345, 521	6, 647, 639	.....	6, 302, 118
1884	58, 398	6, 214, 521	.....	6, 156, 123
1885	155, 728	7, 620, 939	.....	7, 465, 211
1886	311, 456	7, 509, 010	.....	7, 197, 554
1887	87, 597	9, 105, 222	.....	9, 017, 625
1888	199, 527	8, 895, 962	.....	8, 696, 435
1889	452, 585	6, 117, 190	.....	5, 664, 605
1890	199, 527	5, 645, 140	.....	5, 445, 613
1891	116, 796	5, 353, 150	.....	5, 236, 354
1892	162, 336	5, 713, 680	.....	5, 551, 344
1893	314, 000	5, 917, 000	.....	5, 603, 000
1894	272, 524	5, 635, 407	.....	5, 362, 883
1895	11, 217, 505	6, 437, 865	\$4, 779, 640	.....
1896	95, 000	5, 800, 000	.....	5, 705, 000
1897	41, 000	4, 887, 000	.....	4, 846, 000
Total	17, 124, 594	136, 173, 803	4, 779, 640	123, 828, 849

Value of GOLD COIN and BULLION imported into and exported from Chile.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1898		\$4,591,045	.....	\$4,591,045
1899	\$2,798	1,826,461	.....	1,823,663

Value of SILVER COIN and BULLION imported into and exported from Chile.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1898		\$4,061,272	.....	\$4,061,272
1899		1,531,409	.....	1,531,409

CAPE COLONY.

Value of GOLD COIN and BULLION imported into and exported from Cape Colony since 1825.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1825-1865 a.....	\$16,606,980	\$5,196,147	\$11,410,833	.....
1866	48,665	57,872	.....	\$9,207
1867	170,327	93,252	77,075	.....
1868	488,363	57,989	430,374	.....
1869	121,662	195,448	.....	73,786
1870	968,433	140,505	827,928	.....
1871	3,220,333	252,143	2,968,190	.....
1872	8,848,416	303,830	8,544,586	.....
1873	1,511,389	485,087	1,026,302	.....
1874	810,608	1,211,680	.....	401,072
1875	95,758	880,705	.....	784,947
1876	1,303,682	659,747	643,935	.....
1877	1,376,129	127,721	1,248,408	.....
1878	2,123,575	372,029	1,751,546	.....
1879	2,825,811	1,274,774	1,551,037	.....
1880	1,798,171	716,436	1,081,735	.....
1881				
1882	1,290,737	249,233	1,041,504	.....
1883				
1884				
1885	979,914	1,893,818	.....	913,904
1886	842,391	871,970	.....	29,579
1887	3,339,378	228,580	3,110,798	.....
1888		2,516,569	.....	2,516,569
1889		12,685,544	.....	12,685,544
1890	3,649,875	9,132,849	.....	5,482,974
1891		12,115,726	.....	12,115,726
1892	837	20,927,541	.....	20,926,704
1893		25,915,276	.....	25,915,276
1894	1,143,628	35,838,390	.....	34,694,762
1895	27,349,779	40,654,318	.....	13,304,539
1896	3,990,530	38,944,434	.....	34,953,901
1897	487	66,288,232	.....	66,287,745
1898		81,606,323	.....	81,606,323
1899	20,563,659	73,068,702	.....	52,505,043
1900	8,663,158	1,842,583	6,820,575	.....
1901	1,461,045	9,549,450	.....	8,088,405
Total.....	115,593,720	446,354,903	42,534,826	373,296,009

a For the period.

Value of SILVER COIN and BULLION imported into and exported from Cape Colony since 1825.

Years.	Imports.	Exports.	Excess of imports over exports.	Excess of exports over imports.
1825-1865 <i>a</i>	\$1,367,389	\$587,240	\$780,149	.....
1866		9,387		\$9,387
1867		9,991		9,991
1868	487	8,331		7,844
1869		6,395		6,395
1870		23,551		23,551
1871	52,072	12,531	39,541	.....
1872	837,521	49,940	787,581	.....
1873	164,716	18,186	146,530	.....
1874		30,182		30,182
1875	56,680	23,130	33,550	.....
1876	26,016	7,504	18,512	.....
1877	74,477	10,375	64,102	.....
1878	2,998	501	2,497	.....
1879	15,621	638	14,983	.....
1880	278,899	3,100	275,799	.....
1881 .....				.....
1882	109,594	17,734	91,860	.....
1883 .....				.....
1884 .....				.....
1885	89,329	202,285		112,956
1886	2,433	127,176		124,743
1887	239,485	82,794	156,691	.....
1888 .....				.....
1889 .....				.....
1890	297,830	35,263	262,567	.....
1891	51,098	768	50,330	.....
1892	20,488	429,164		408,676
1893	228,725	452,122		223,397
1894	529,047	344,383	184,664	.....
1895	386,463	243,082	143,381	.....
1896	806,184	65,440	740,744	.....
1897	297,479	159,529	137,950	.....
1898	476,722	164,507	312,215	.....
1899	450,930	232,916	218,014	.....
1900	1,526,067	37,214	1,488,853	.....
1901	902,512	26,829	875,683	.....
Total	9,291,265	3,422,191	6,826,199	957,125

10472—02—24

a For the period.

XXV.—COINAGE OF NATIONS.

Country.	1899.		1900.		1901.	
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
United States	\$111,344,220	\$26,061,520	\$99,272,943	\$36,345,321	\$101,735,187	\$30,838,461
Abyssinia		201,724		50		94,059
Arabia		1,022		2,044		
Austria-Hungary	4,992,663	3,176,050	3,575,517	4,937,839	3,817,524	3,604,414
Lichtenstein	9,178	15,322				
Belgium		96,500				579,000
Bolivia		1,941,532				2,450,218
Brazil	105,673					
British Empire:						
Australasia	46,926,487		48,782,482		48,228,115	
British Guiana				3,650		4,867
Canada		398,895		589,000		420,000
Ceylon		97,320		97,330		
Cyprus				316,323		
Great Britain	43,852,085	7,910,885	63,769,609	10,107,818	12,672,366	4,187,662
Honduras						10,000
Hongkong		34,596,185		14,919,991		30,248,656
India		^a 7,221,063		^a 56,013,002		^a 16,658,916
Mauritius		9,730				
Newfoundland		100,000		100,000		
Sarawak				60,000		
Straits Settlements		636,000		800,000		600,000
Costa Rica	698,023	10,000	1,047,041			
Crete						366,700
Denmark		136,548	1,082,870	80,788		
Ecuador	964,700	50,000	243,325	23,359		
Egypt				605,544		367,867
France	10,419,111	5,211,000	5,799,424	1,099,421	14,451,668	2,393,200
French Colonies:						
Indo-China		5,733,397		14,620,957		3,876,984
Tunis	579,232	347	579,232	347	579,232	
Germany	33,628,453	4,346,302	34,680,396	5,645,281	28,149,252	7,148,713
Colony of German East Africa		73,567		111,183		243,492
Guatemala						3,000
Italy		485,950		157,767		516,755
Colony of San Marino		28,950			No returns.	
Japan	8,705,377	4,363,709	5,567,128	1,295,850	988,264	536,025
Korea						298,800
Mexico	676,063	18,749,740	568,825	17,097,050	625,798	21,821,900
Monaco					295,116	
Morocco		443,120		430,939		117,084
Netherlands	724,452	265,320	804,342	1,236,150	465,807	1,376,850
Netherlands Colonies:						
Curacao				48,240		12,060
Dutch East Indies				556,770		402,000
Norway		160,800		134,000		160,800
Persia					3,323	4,698,055
Peru	164,658	165,000	309,183	109,575	395,427	74,240
Portugal		2,754,000		648,000		611,506
Russia	^b 194,481,077	^b 20,967,769	^b 83,221,525	^b 3,946,971	^b 31,527,256	^b 3,681,185
Santo Domingo		240,395				
Siam		4,080,000		263,473		85,687
Spain	4,863,650	14,884,262	3,188,055	3,804,852	No returns.	
Sweden	1,537,641	248,910	558,507	101,517	1,932,915	72,603
Switzerland	1,158,000	115,800	1,544,000	147,645	1,930,000	115,800
Turkey	279,871	248,330	342,093	7,852	296,537	8,335
Venezuela				546,003		225,997
Total	466,110,614	166,226,964	354,936,497	177,011,902	248,093,787	138,911,891

^a Fiscal year 1899-1900 rupee calculated at \$0.3244.^b Ruble calculated at coining rate \$0.5145.

XXVI.—WORLD'S PRODUCTION OF GOLD AND SILVER FOR CALENDAR YEARS 1899, 1900, AND 1901.

[Kilogram of gold, \$664.60; kilogram of silver, \$41.56, coining rate in the United States silver dollars.
Fine ounce of gold, \$20.67183+; fine ounce of silver, \$1.292929+, coining rate in United States silver dollars.]

1899.

Countries.	GOLD.			SILVER.			
	Kilo-grams (fine).	Ounces (fine).	Value.	Kilo-grams (fine.)	Ounces (fine).	Coining value.	Commer- cial value.
North America:							
United States.....	106,911	3,437,210	\$71,053,400	1,703,720	54,764,500	\$70,806,600	\$32,858,700
Mexico.....	12,790	411,187	<i>a</i> 8,500,000	1,730,089	55,612,090	71,902,500	33,367,300
Canada and New- foundland.....	32,086	<i>b</i> 1,031,563	21,324,300	106,136	3,411,644	4,411,000	2,047,000
Africa.....	109,876	3,532,488	73,023,000				
Australasia.....	119,352	3,837,181	79,321,600	396,266	12,737,598	16,468,800	7,642,600
Europe:							
Russia.....	33,354	1,072,333	22,167,100	4,196	134,887	174,400	80,900
Austria-Hungary..	2,925	94,037	1,943,900	58,961	1,895,253	2,450,400	1,137,200
Germany.....	112	3,589	74,200	194,190	6,242,053	8,070,500	3,745,200
Norway.....	15	484	10,000	4,598	147,798	191,100	88,700
Sweden.....	106	3,414	70,600	2,290	73,619	95,200	44,200
Italy.....	113	3,633	75,100	25,494	819,481	1,059,500	491,700
Spain.....	<i>c</i> 3	96	2,000	<i>c</i> 76,295	2,452,940	3,171,500	1,471,800
Portugal.....	<i>c</i> 2	54	1,100	<i>c</i> 119	3,790	4,900	2,300
Greece.....				36,659	1,178,369	1,523,500	707,000
Turkey.....	<i>c</i> 21	675	14,000	<i>c</i> 4,422	142,141	183,800	85,300
Finland.....	3	84	1,700	260	8,333	10,800	5,000
France.....				14,500	466,089	602,600	279,700
Great Britain.....	88	2,844	58,800	5,804	186,582	241,200	111,900
South America:							
Argentina.....	207	6,661	<i>d</i> 137,700	11,930	383,479	<i>d</i> 495,800	230,100
Bolivia.....	226	7,249	149,900	337,355	10,843,977	14,020,500	6,506,400
Chile.....	1,954	62,819	1,298,600	129,503	4,162,718	5,382,100	2,497,600
Colombia.....	2,775	89,231	1,844,600	109,556	3,521,563	4,553,100	2,112,900
Ecuador.....	72	2,317	47,900	240	7,734	<i>a</i> 10,000	4,600
Brazil.....	3,234	103,983	2,149,500				
Venezuela.....	893	28,710	593,500				
Guiana (British) ..	3,070	98,712	2,040,500				
Guiana (Dutch) ...	721	23,196	479,500				
Guiana (French) ..	2,541	81,691	1,688,700				
Peru.....	1,295	41,634	860,700	203,000	6,525,245	8,436,700	3,915,100
Uruguay.....	41	1,331	27,500	20	643	800	400
Central America.....	881	28,355	586,100	28,377	912,170	1,179,400	547,300
Asia:							
Japan.....	1,420	45,653	943,700	52,971	1,702,757	2,201,500	1,021,700
China.....	8,387	269,662	5,574,400				
Korea.....	2,195	70,579	1,459,000				
India (British) ..	13,029	418,869	8,658,800				
East Indies (Brit- ish).....	640	20,562	425,100				
East Indies (Dutch)	177	5,689	117,600				
Total.....	461,515	14,837,775	306,724,100	5,236,951	168,337,453	217,648,200	101,002,600

a Estimate Bureau of the Mint.*b* Newfoundland product for 1897 included.*c* Figures for 1898 repeated.*d* Figures for 1897 repeated.

XXVI.—WORLD'S PRODUCTION OF GOLD AND SILVER FOR CALENDAR YEARS 1899, 1900, AND 1901—Continued.

1900.

Country.	GOLD.			SILVER.			
	Kilo-grams (fine).	Ounces (fine).	Value.	Kilo-grams (fine).	Ounces (fine).	Coining value.	Commercial value.
North America;							
United States.....	119,126	3,829,897	\$79,171,000	1,793,395	57,617,000	\$74,533,500	\$35,741,100
Mexico.....	13,542	435,375	^a 9,000,000	1,786,887	57,437,808	71,263,000	35,611,400
Canada.....	41,951	1,348,720	27,880,500	138,400	4,448,755	5,751,900	2,758,200
Africa.....	13,048	419,503	8,671,900				
Australasia.....	110,591	3,555,506	73,498,900	415,014	13,340,263	17,248,000	8,271,000
Europe:							
Russia.....	30,312	974,537	20,145,500	4,458	143,299	185,300	88,800
Austria-Hungary..	3,223	103,615	2,141,900	61,871	1,988,774	2,571,300	1,233,000
Germany.....	99	3,192	66,000	168,350	5,411,441	6,996,600	3,355,100
Norway.....				5,377	172,839	223,500	107,200
Sweden.....	88	2,845	58,800	1,928	61,983	80,100	38,400
Italy.....	53	1,704	35,200	23,374	751,335	971,400	465,800
Spain.....	13	418	8,600	99,095	3,185,316	4,118,400	1,974,900
Portugal.....	3	83	1,700	^c 119	3,790	4,900	2,300
Greece.....				31,472	1,011,656	1,308,000	627,200
Turkey.....	^c 21	675	14,000	^c 4,422	142,144	183,800	88,100
Finland.....	^b 3	84	1,700	^b 244	7,843	10,100	4,900
France.....				14,067	452,151	584,600	280,300
Great Britain.....	415	13,360	276,200	6,896	221,673	286,600	137,400
South America;							
Argentina.....	66	2,112	43,700	1,178	37,898	49,000	23,500
Bolivia.....	180	5,786	119,600	341,295	10,970,610	14,184,200	6,801,800
Chile.....	2,149	78,735	1,627,600	^b 129,503	4,162,718	5,382,100	2,580,900
Colombia.....	1,798	57,804	1,194,900	57,994	1,864,165	2,410,200	1,155,800
Ecuador.....	162	5,208	107,700	240	7,734	10,000	4,800
Brazil.....	4,176	134,260	2,775,400				
Venezuela.....	483	15,538	321,200				
Guiana (British) ..	3,063	98,487	2,035,900				
Guiana (Dutch)....	698	22,439	463,800				
Guiana (French)...	2,378	76,468	1,580,700				
Peru.....	1,633	52,498	1,085,200	226,973	7,295,825	9,433,000	4,523,400
Uruguay.....	46	1,492	30,800	25	800	1,000	500
Central America.....	752	24,188	500,000	31,523	1,013,285	1,310,100	628,200
Asia:							
Japan.....	1,808	58,127	1,201,600	53,809	1,729,603	2,236,300	1,072,400
China.....	8,387	269,662	^b 5,574,400				
Korea.....	6,771	217,687	4,500,000				
India (British).....	11,197	456,444	9,435,500				
East Indies (British) ..	860	27,643	571,400				
East Indies (Dutch)...	654	21,043	435,000	2,509	80,659	104,300	50,000
Total.....	383,049	12,315,135	254,576,300	5,400,418	173,591,364	224,441,200	107,626,400

^a Estimate Bureau of the Mint.^b Figures for 1899 repeated.^c Figures for 1898 repeated.

XXVI.—WORLD'S PRODUCTION OF GOLD AND SILVER FOR THE CALENDAR YEARS 1899, 1900, AND 1901—Continued.

1901.

Country.	GOLD.			SILVER.			
	Kilo-grams (fine).	Ounces (fine).	Value.	Kilo-grams (fine).	Ounces (fine).	Coining value.	Commercial value.
North America:							
United States.....	118,367	3,805,500	\$78,666,700	1,717,705	55,214,000	\$71,387,800	\$33,128,400
Mexico.....	15,475	497,527	10,284,800	1,793,692	57,656,549	74,545,900	34,593,900
Canada.....	36,305	1,167,216	24,128,500	163,099	5,242,697	6,778,400	3,145,600
Africa.....	13,677	439,704	9,089,500				
Australasia.....	115,679	3,719,080	76,880,200	405,960	13,049,243	16,871,700	7,829,500
Europe:							
Russia.....	34,383	1,105,412	22,850,900	4,884	156,993	203,000	94,200
Austria-Hungary..	3,215	103,363	2,136,700	62,118	1,996,706	2,581,600	1,198,000
Germany.....	90	2,893	59,800	171,778	5,521,648	7,139,100	3,313,000
Norway.....				5,161	165,902	214,500	99,500
Sweden.....	63	2,017	41,700	1,680	53,986	69,800	32,400
Italy.....	^a 53	1,704	35,200	^a 23,374	751,335	971,400	450,800
Spain.....	^a 13	418	8,600	99,095	3,185,316	4,118,400	1,911,200
Portugal.....	2	63	1,300	^a 119	3,790	4,900	2,300
Greece.....				35,902	1,154,046	1,492,100	692,400
Turkey.....	37	1,185	24,500	13,352	429,180	554,900	257,500
Finland.....	2	63	1,300	^a 244	7,843	10,100	4,700
France.....				14,067	452,151	584,600	271,300
Great Britain.....	^a 415	13,360	276,200	^a 6,896	221,673	286,600	133,000
South America:							
Argentina.....	45	1,451	30,000	1,405	45,166	58,400	27,100
Bolivia.....	180	5,786	119,600	319,009	10,254,260	13,258,000	6,152,600
Chile.....	1,606	51,626	1,067,200	287,926	9,255,130	11,966,200	5,553,100
Colombia.....	4,215	135,513	2,801,300	58,537	1,881,649	2,432,800	1,129,000
Ecuador.....	165	5,321	110,000	^a 240	7,734	10,000	4,600
Brazil.....	4,176	134,260	2,775,400				
Venezuela.....	483	15,538	321,200				
Guiana (British)..	2,666	85,701	1,771,600				
Guiana (Dutch)...	610	19,621	405,600				
Guiana (French)...	^b 3,009	96,750	2,000,000				
Peru.....	2,000	64,300	1,329,200	174,242	5,600,848	7,241,500	3,360,500
Uruguay.....	47	1,530	31,700	^a 25	800	1,000	500
Central America	963	30,974	640,300	27,365	879,666	1,137,400	527,800
Asia:							
Japan.....	1,808	58,127	1,201,600	^a 53,809	1,729,603	2,236,300	1,037,800
China.....	13,680	439,801	9,091,500				
Korea.....	^a 6,771	217,687	4,500,000				
India (British)...	14,138	454,527	9,395,900				
East Indies (British).....	1,296	41,685	861,700				
East Indies (Dutch).....	^a 654	21,043	435,000	^a 2,509	80,659	104,300	48,400
Total.....	396,288	12,740,746	263,374,700	5,444,193	174,998,573	226,260,700	104,999,100

^a Figures for 1900 repeated.^b Estimate, Bureau of the Mint.

XXVII.—PRODUCTION OF GOLD AND SILVER IN

[From 1493 to 1885 is from a table of averages for certain periods, compiled by Dr. Adolph Soetbeer.

	Period.	GOLD.			
		Average annual for period.		Total for period.	
		Fine ounces.	Value.	Fine ounces.	Value.
1	1493-1520	186,470	\$3,855,000	5,221,160	\$107,931,000
2	1521-1544	230,194	4,759,000	5,524,656	114,205,000
3	1545-1560	273,596	5,656,000	4,377,544	90,492,000
4	1561-1580	219,906	4,546,000	4,398,120	90,917,000
5	1581-1600	237,267	4,905,000	4,745,340	98,095,000
6	1601-1620	273,918	5,662,000	5,478,360	113,248,000
7	1621-1640	266,845	5,516,000	5,336,900	110,324,000
8	1641-1660	281,955	5,828,000	5,639,110	116,571,000
9	1661-1680	297,709	6,154,000	5,954,180	123,084,000
10	1681-1700	346,095	7,154,000	6,921,895	143,088,000
11	1701-1720	412,163	8,520,000	8,243,260	170,403,000
12	1721-1740	613,422	12,681,000	12,268,440	253,611,000
13	1741-1760	791,211	16,356,000	15,824,230	327,116,000
14	1761-1780	665,666	13,761,000	13,313,315	275,211,000
15	1781-1800	571,948	11,823,000	11,438,970	236,464,000
16	1801-1810	571,563	11,815,000	5,715,627	118,152,000
17	1811-1820	367,957	7,606,000	3,679,568	76,063,000
18	1821-1830	457,044	9,448,000	4,570,444	94,479,000
19	1831-1840	652,291	13,484,000	6,522,918	134,841,000
20	1841-1850	1,760,502	36,393,000	17,605,018	363,928,000
21	1851-1855	6,410,324	132,513,000	32,051,621	662,566,000
22	1856-1860	6,486,262	134,083,000	32,431,312	670,415,000
23	1861-1865	5,949,582	122,989,000	29,747,913	614,944,000
24	1866-1870	6,270,086	129,614,000	31,350,430	648,071,000
25	1871-1875	5,591,014	115,577,000	27,955,068	577,883,000
26	1876-1880	5,543,110	114,586,000	27,715,550	572,931,000
27	1881-1885	4,794,755	99,116,000	23,973,773	495,582,000
28	1886-1890	5,461,282	112,895,000	27,306,411	564,474,000
29	1891-1895	7,882,565	162,947,000	39,412,823	814,736,000
30	1896	9,783,914	202,251,600	9,783,914	202,251,600
31	1897	11,420,068	236,073,700	11,420,068	236,073,700
32	1898	13,877,806	286,879,700	13,877,806	286,879,700
33	1899	14,837,775	306,724,100	14,837,775	306,724,100
34	1900	12,315,135	254,576,300	12,315,135	254,576,300
35	1901	12,740,746	263,374,700	12,740,746	263,374,700
	Total.....	.....	.....	499,699,395	10,329,705,100

THE WORLD SINCE THE DISCOVERY OF AMERICA.

For the years 1886 to 1898 the production is the annual estimate of the Bureau of the Mint.]

SILVER.				PERCENTAGE OF PRODUCTION.			
Annual average for period.		Total for period.		By weight.		By value.	
Fine ounces.	Coining value.	Fine ounces.	Coining value.	Gold.	Silver.	Gold.	Silver.
1,511,050	\$1,954,000	42,309,400	\$54,703,000	11	89	66.4	33.6
2,899,930	3,740,000	69,598,320	89,986,000	7.4	92.6	55.9	44.1
10,017,940	12,952,000	160,287,040	207,240,000	2.7	97.3	30.4	69.6
9,628,925	12,450,000	192,578,500	248,990,000	2.2	97.8	26.7	73.3
13,467,635	17,413,000	269,352,700	348,254,000	1.7	98.3	22	78
13,596,235	17,579,000	271,924,700	351,579,000	2	98	24.4	75.6
12,654,240	16,361,000	253,084,800	327,221,000	2.1	97.9	25.2	74.8
11,776,545	15,226,000	235,530,900	304,525,000	2.3	97.7	27.7	72.3
10,834,550	14,008,000	216,691,000	280,166,000	2.7	97.3	30.5	69.5
10,992,085	14,212,000	219,841,700	284,240,000	3.1	96.9	33.5	66.5
11,432,540	14,781,000	228,650,800	295,629,000	3.5	96.5	36.6	63.4
13,863,080	17,924,000	277,261,600	358,480,000	4.2	95.8	41.4	58.6
17,140,612	22,162,000	342,812,235	443,232,000	4.4	95.6	42.5	57.5
20,985,591	27,133,000	419,711,820	542,658,000	3.1	96.9	33.7	66.3
28,261,779	36,540,000	565,235,580	730,810,000	2	98	24.4	75.6
28,746,922	37,168,000	287,469,225	371,677,000	1.9	98.1	24.1	75.9
17,385,755	22,479,000	173,857,555	224,780,000	2.1	97.9	25.3	74.7
14,807,004	19,144,000	148,070,040	191,444,000	3	97	33	67
19,175,867	24,793,000	191,758,675	247,930,000	3.3	96.7	35.2	64.8
25,090,342	32,440,000	250,903,422	324,400,000	6.6	93.4	52.9	47.1
28,488,597	36,824,000	142,442,986	184,169,000	18.4	81.6	78.3	21.7
29,095,428	37,618,000	145,477,142	188,092,000	18.2	81.8	78.1	21.9
35,401,972	45,772,000	177,009,862	228,861,000	14.4	85.6	72.9	27.1
43,051,583	55,663,000	215,257,914	278,313,000	12.7	87.3	70	30
63,317,014	81,864,000	316,585,069	409,322,000	8.1	91.9	58.5	41.5
78,775,602	101,851,000	393,878,009	509,256,000	6.6	93.4	53	47
92,003,944	118,955,000	460,019,722	594,773,000	5	95	45.5	54.5
108,911,431	140,815,000	544,557,155	704,074,000	4.8	95.2	44.5	55.5
157,581,331	203,742,000	787,906,656	1,018,708,000	4.8	95.2	44.4	55.6
157,061,370	203,069,200	157,061,370	203,069,200	5.9	94.1	49.9	50.1
160,421,082	207,413,000	160,421,082	207,413,000	6.7	93.3	53.2	46.8
169,055,253	218,576,800	169,055,253	218,576,800	7.6	92.4	56.8	43.2
168,337,453	217,648,200	168,337,453	217,648,200	8.1	91.9	58.5	41.5
173,591,364	224,441,200	173,591,364	224,441,200	6.6	93.4	53.2	46.8
174,998,573	226,260,700	174,998,573	226,260,700	6.8	93.2	53.8	46.2
-----	-----	9,003,529,622	11,640,921,100	5.3	94.7	47	53

XXVIII.—COINAGE OF THE MINTS OF THE UNITED STATES FROM THEIR ORGANIZATION, 1792, TO DECEMBER 31, 1901.

Denomination.	Pieces.	Value.
GOLD.		
Double eagles.....	80,310,379	\$1,606,207,580.00
Eagles.....	36,509,781	365,097,810.00
Half eagles.....	56,764,011	283,820,055.00
Three-dollar pieces (coinage discontinued, act of Sept. 26, 1890)....	539,792	1,619,376.00
Quarter eagles.....	11,737,670	29,344,175.00
Dollars (coinage discontinued, act of Sept. 26, 1890).....	19,499,337	19,499,337.00
Total gold.....	205,360,970	2,305,588,333.00
SILVER.		
Dollars (coinage discontinued under act of Feb. 12, 1873, and resumed under act of Feb. 28, 1878).....	540,986,666	540,986,666.00
Trade dollars.....	35,965,924	35,965,924.00
Lafayette souvenir dollars (act of Mar. 3, 1899).....	50,000	50,000.00
Half dollars.....	302,733,275	151,366,637.50
Half dollars, Columbian souvenir.....	5,002,105	2,501,052.50
Quarter dollars.....	273,193,963	68,298,490.75
Quarter dollars, Columbian souvenir.....	40,023	10,005.75
Twenty-cent pieces (coinage discontinued, act of May 2, 1878).....	1,355,000	271,000.00
Dimes.....	378,520,782	39,852,078.20
Half dimes (coinage discontinued, act of Feb. 12, 1873).....	97,604,388	4,880,219.40
Three-cent pieces (coinage discontinued, act of Feb. 12, 1873).....	42,736,240	1,282,087.20
Total silver.....	1,678,188,366	845,464,161.30
MINOR.		
Five-cent pieces, nickel.....	402,623,475	20,131,173.75
Three-cent pieces, nickel (coinage discontinued, act of Sept. 26, 1890).....	31,378,316	941,349.48
Two-cent pieces, bronze (coinage discontinued, act of Sept. 26, 1890).....	45,601,000	912,020.00
One-cent pieces, copper (coinage discontinued, act of Feb. 21, 1857).....	156,288,744	1,562,887.44
One-cent pieces, nickel (coinage discontinued, act of Apr. 22, 1864).....	200,772,000	2,007,720.00
One-cent pieces, bronze.....	1,124,125,102	11,241,251.02
Half-cent pieces, copper (coinage discontinued, act of Feb. 21, 1857).....	7,985,222	39,926.11
Total minor.....	1,968,773,859	36,836,327.80
Total coinage.....	3,852,323,195	3,187,888,822.10
Silver-dollar coinage under act of Apr. 2, 1792.....		\$8,031,238
Silver-dollar coinage under Bland-Allison Act, Feb. 28, 1878.....	\$378,166,793	
Silver-dollar coinage under Sherman Act, July 14, 1890, to Oct. 31, 1893.....	\$36,087,285	
Coinage from repeal of purchasing clause (Nov. 1, 1893) of Sherman Act to June 12, 1898.....	42,139,872	
Coined under war-revenue bill approved June 13, 1898, to Dec. 31, 1901.....	71,483,006	
	149,710,163	
Act of Mar. 3, 1891, recoinage of trade dollars.....	5,078,472	
		532,955,428
Total.....		540,986,666

XXIX.—COINAGE OF SILVER DOLLARS, FRACTIONAL AND SUBSIDIARY SILVER, BY ACTS AND DENOMINATIONS, FROM 1792 TO 1901.

Denomination.	1792 to 1853.	1853 to Feb. 12, 1873.	Feb. 12, 1873, to Dec. 31, 1901.	Total silver.
Dollars.....	\$2,506,890.00	\$5,524,348.00	\$532,955,428.00	\$540,986,666.00
Trade dollars.....			35,965,924.00	35,965,924.00
Lafayette souvenir dollars.....			50,000.00	50,000.00
Total dollars.....	2,506,890.00	5,524,348.00	568,971,352.00	577,002,590.00
Half dollars.....	66,280,640.50	32,666,832.50	52,419,164.50	151,366,637.50
Half dollars, Columbian.....			2,501,052.50	2,501,052.50
Quarter dollars.....	3,994,040.50	17,879,790.50	46,424,659.75	68,298,490.75
Quarter dollars, Columbian.....			10,005.75	10,005.75
Twenty-cent pieces.....			271,000.00	271,000.00
Dimes.....	3,890,230.10	4,908,520.00	31,053,328.10	39,852,078.20
Half dimes.....	1,825,126.40	3,055,093.00		4,880,219.40
Three-cent pieces.....	744,927.00	537,160.20		1,282,087.20
Total subsidiary.....	76,734,964.50	59,047,396.20	132,679,210.60	268,461,571.30
Total silver.....	79,241,854.50	64,571,744.20	701,650,562.60	845,464,161.30
Fractional silver coinage, 1792 to 1853.....				\$76,734,964.50
Subsidiary silver coinage, 1853 to Feb. 12, 1873.....				59,047,396.20
Subsidiary silver coinage, Feb. 12, 1873, to Dec. 31, 1901.....				132,679,210.60
Total.....				268,461,571.30

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1793 to 1795		\$27, 950	\$43, 535			
1796		60, 800	16, 995		\$165. 00	
1797		91, 770	32, 030		4, 390. 00	
1798		79, 740	124, 335		1, 535. 00	
1799		174, 830	37, 255		1, 200. 00	
1800		259, 650	58, 110			
1801		292, 540	130, 030			
1802		150, 900	265, 880		6, 530. 00	
1803		89, 790	167, 530		1, 057. 50	
1804		97, 950	152, 375		8, 317. 50	
1805			165, 915		4, 452. 50	
1806			320, 465		4, 040. 00	
1807			420, 465		17, 030. 00	
1808			277, 890		6, 775. 00	
1809			169, 375			
1810			501, 435			
1811			497, 905			
1812			290, 435			
1813			477, 140			
1814			77, 270			
1815			3, 175			
1816						
1817						
1818			242, 940			
1819			258, 615			
1820			1, 319, 030			
1821			173, 205		16, 120. 00	
1822			88, 980			
1823			72, 425			
1824			86, 700		6, 500. 00	
1825			145, 300		11, 085. 00	
1826			90, 345		1, 900. 00	
1827			124, 565		7, 000. 00	
1828			140, 145			
1829			287, 210		8, 507. 50	
1830			631, 755		11, 350. 00	
1831			702, 970		11, 300. 00	
1832			787, 435		11, 000. 00	
1833			968, 150		10, 400. 00	
1834			3, 660, 845		293, 425. 00	
1835			1, 857, 670		328, 505. 00	
1836			2, 765, 735		1, 369, 965. 00	
1837			1, 035, 605		112, 700. 00	
1838		72, 000	1, 432, 910		117, 575. 00	
1839		382, 480	590, 715		67, 552. 50	
1840		473, 380	686, 910		47, 147. 50	
1841		631, 310	79, 165			
1842		815, 070	137, 890		7, 057. 50	
1843		754, 620	3, 056, 025		251, 365. 00	
1844		63, 610	1, 701, 650		16, 960. 00	
1845		261, 530	2, 085, 495		227, 627. 50	
1846		200, 950	1, 979, 710		53, 995. 00	
1847		8, 622, 580	4, 579, 905		74, 535. 00	
1848		1, 454, 810	1, 303, 875		22, 215. 00	
1849		6, 536, 180	665, 350		58, 235. 00	\$688, 567
1850	\$23, 405, 220	2, 914, 510	322, 455		632, 307. 50	481, 953
1851	41, 743, 100	1, 763, 280	1, 887, 525		3, 431, 870. 00	3, 317, 671
1852	41, 060, 520	2, 631, 060	2, 869, 505		2, 899, 202. 50	2, 045, 351
1853	25, 226, 520	2, 012, 530	1, 528, 850		3, 511, 670. 00	4, 076, 051
1854	45, 157, 980	542, 500	803, 375	\$415, 854	1, 490, 645. 00	1, 639, 445
1855	7, 293, 320	1, 217, 010	585, 490	151, 665	588, 700. 00	758, 269
1856	6, 597, 560	604, 900	989, 950	78, 030	960, 600. 00	1, 762, 936
1857	8, 787, 500	166, 060	490, 940	62, 673	535, 325. 00	774, 789
1858	4, 234, 280	25, 210	75, 680	6, 399	118, 442. 50	117, 995
1859	871, 940	160, 930	84, 070	46, 914	98, 610. 00	168, 244
1860	11, 553, 400	117, 830	99, 125	21, 465	56, 687. 50	36, 668
1861	59, 529, 060	1, 132, 330	3, 199, 750	18, 216	3, 181, 295. 00	527, 499
1862	1, 812, 660	109, 950	22, 325	17, 355	280, 882. 50	1, 326, 865
1863	2, 855, 800	12, 480	12, 360	15, 117	75. 00	6, 250
1864	4, 085, 700	35, 800	21, 100	8, 040	7, 185. 00	5, 950
1865	7, 024, 000	40, 050	6, 475	3, 495	3, 862. 50	3, 725
Carried forward	261, 268, 560	35, 080, 900	50, 967, 775	845, 223	20, 996, 875. 00	17, 738, 228

NOTE.—Not susceptible of exact statement by years of actual date of coin, the registry of annual coinage being of coin delivered by coiners of mints within the given year, and these deliveries not having been invariably completed within the year of the date of the coin, as now required.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS.

its organization, 1793, to December 31, 1901.]

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
	\$204, 791	\$161, 572. 00				\$1, 320. 80	
	72, 920		\$1, 473. 50		\$2, 213. 50	511. 50	
	7, 776	1, 959. 00	63. 00		2, 526. 10	2, 226. 35	
	327, 536				2, 755. 00		
	423, 515						
	220, 920				2, 176. 00	1, 200. 00	
	54, 454	15, 144. 50			3, 464. 00	1, 695. 50	
	41, 650	14, 915. 00			1, 097. 50	650. 50	
	66, 064	15, 857. 50			3, 304. 00	1, 892. 50	
	19, 570	78, 259. 50	1, 684. 50		826. 50		
	321	105, 861. 00	30, 348. 50		12, 078. 00	780. 00	
		419, 788. 00	51, 531. 00				
		525, 788. 00	55, 160. 75		16, 500. 00		
		684, 300. 00					
		702, 905. 00			4, 471. 00		
		638, 138. 00			635. 50		
		601, 822. 00			6, 518. 00		
		814, 029. 50					
		620, 951. 50					
		519, 537. 50			42, 150. 00		
			17, 308. 00				
		23, 575. 00	5, 000. 75				
		607, 783. 50					
		980, 161. 00	90, 293. 50				
		1, 104, 000. 00	36, 000. 00				
		375, 561. 00	31, 861. 00		94, 258. 70		
		652, 898. 50	54, 212. 75		118, 651. 20		
		779, 786. 50	16, 020. 00		10, 000. 00		
		847, 100. 00	4, 450. 00		44, 000. 00		
		1, 752, 477. 00					
		1, 471, 583. 00	42, 000. 00		51, 000. 00		
		2, 002, 090. 00					
		2, 746, 700. 00	1, 000. 00		121, 500. 00		
		1, 537, 600. 00	25, 500. 00		12, 500. 00		
		1, 856, 078. 00			77, 000. 00	61, 500. 00	
		2, 382, 400. 00			51, 000. 00	62, 000. 00	
		2, 936, 830. 00	99, 500. 00		77, 135. 00	62, 135. 00	
		2, 398, 500. 00	80, 000. 00		52, 250. 00	48, 250. 00	
		2, 603, 000. 00	39, 000. 00		48, 500. 00	68, 500. 00	
		3, 206, 002. 00	71, 500. 00		63, 500. 00	74, 000. 00	
		2, 676, 003. 00	488, 000. 00		141, 000. 00	138, 000. 00	
	1, 000	3, 273, 100. 00	118, 000. 00		119, 000. 00	95, 000. 00	
		1, 814, 910. 00	63, 100. 00		104, 200. 00	113, 800. 00	
		1, 773, 000. 00	208, 000. 00		199, 250. 00	112, 750. 00	
	300	1, 667, 280. 00	122, 786. 50		105, 311. 50	53, 457. 50	
	61, 005	717, 504. 00	47, 031. 75		135, 858. 00	67, 204. 25	
	173, 000	155, 000. 00	30, 000. 00		162, 250. 00	57, 500. 00	
	184, 618	1, 006, 382. 00	22, 000. 00		188, 750. 00	40, 750. 00	
	165, 100	1, 922, 000. 00	161, 400. 00		137, 000. 00	58, 250. 00	
	20, 000	883, 000. 00	105, 300. 00		7, 250. 00	21, 500. 00	
	24, 500	294, 500. 00	230, 500. 00		175, 500. 00	78, 200. 00	
	110, 600	1, 105, 000. 00	127, 500. 00		3, 130. 00	1, 350. 00	
	140, 750	578, 000. 00	183, 500. 00		24, 500. 00	63, 700. 00	
	15, 000	290, 000. 00	36, 500. 00		45, 150. 00	33, 400. 00	
	62, 600	626, 000. 00	85, 000. 00		83, 900. 00	65, 450. 00	
	7, 500	113, 500. 00	47, 700. 00		193, 150. 00	47, 750. 00	
	1, 300	100, 375. 00	40, 000. 00		102, 650. 00	39, 050. 00	\$163, 422. 00
	1, 100	38, 565. 00	44, 265. 00		153, 550. 00	50, 025. 00	559, 905. 00
	46, 110	1, 766, 354. 00	3, 813, 555. 00		1, 217, 301. 00	667, 251. 00	342, 000. 00
	33, 140	1, 491, 000. 00	3, 095, 000. 00		447, 000. 00	287, 000. 00	20, 130. 00
	26, 000	379, 750. 00	714, 250. 00		207, 500. 00	87, 500. 00	4, 170. 00
	63, 500	469, 000. 00	1, 816, 000. 00		578, 000. 00	244, 000. 00	43, 740. 00
	94, 000	994, 000. 00	2, 411, 000. 00		558, 000. 00	364, 000. 00	31, 260. 00
		2, 113, 000. 00	1, 842, 000. 00		154, 000. 00	175, 000. 00	48, 120. 00
	256, 500	374, 000. 00	336, 000. 00		43, 000. 00	17, 000. 00	10, 950. 00
	218, 930	151, 850. 00	201, 350. 00		60, 700. 00	39, 950. 00	8, 610. 00
	78, 500	1, 444, 200. 00	1, 213, 650. 00		192, 400. 00	164, 050. 00	14, 940. 00
	12, 090	126, 175. 00	233, 137. 50		84, 755. 00	74, 627. 50	10, 906. 50
	27, 660	251, 830. 00	48, 015. 00		1, 446. 00	923. 00	643. 80
	31, 170	189, 785. 00	23, 517. 50		3, 907. 00	23. 50	14. 10
	47, 000	255, 950. 00	14, 825. 00		1, 050. 00	675. 00	255. 00
	3, 342, 490	65, 225, 996. 50	18, 676, 790. 50		6, 552, 468. 50	3, 648, 798. 90	1, 259, 066. 40

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
Brought forward	\$261,268,560	\$35,080,900	\$50,967,775	\$845,223	\$20,996,875.00	\$17,738,228
1866	13,975,500	37,800	33,600	12,090	7,775.00	7,180
1867	5,021,300	31,400	34,600	7,950	8,125.00	5,250
1868	1,972,000	106,550	28,625	14,625	9,062.50	10,525
1869	3,503,100	18,550	8,925	7,575	10,862.50	5,925
1870	3,103,700	25,350	20,175	10,605	11,387.50	6,335
1871	1,603,000	17,800	16,150	3,990	13,375.00	3,930
1872	5,037,600	16,500	8,450	6,090	7,575.00	3,530
1873	34,196,500	8,250	562,525	75	445,062.50	125,125
1874	7,336,000	531,600	17,540	125,460	9,850.00	198,820
1875	5,914,800	1,200	1,100	60	1,050.00	420
1876	11,678,100	7,320	7,385	135	10,552.50	3,245
1877	7,953,400	8,170	5,760	4,464	4,130.00	3,920
1878	10,872,900	738,000	658,700	246,972	715,650.00	3,020
1879	4,152,600	3,847,700	1,509,750	9,090	222,475.00	3,030
1880	1,029,120	16,448,760	15,832,180	3,108	7,490.00	1,636
1881	45,200	38,772,600	28,544,000	1,650	1,700.00	7,660
1882	12,600	23,244,800	12,572,800	4,620	10,100.00	5,040
1883	800	2,087,400	1,167,200	2,820	4,900.00	10,840
1884	1,420	769,050	955,240	3,318	4,982.50	6,206
1885	16,560	2,535,270	3,007,530	2,730	2,217.50	12,205
1886	22,120	2,361,600	1,942,160	3,426	10,220.00	6,016
1887	2,420	536,800	435	18,480	15,705.00	8,543
1888	4,525,320	1,329,960	91,480	15,873	40,245.00	16,080
1889	882,220	44,850	37,825	7,287	44,120.00	30,729
1890	1,519,900	580,430	21,640	-----	22,032.50	-----
1891	28,840	918,680	307,065	-----	27,600.00	-----
1892	90,460	7,975,520	3,767,860	-----	6,362.50	-----
1893	6,886,780	18,408,950	7,640,985	-----	75,265.00	-----
1894	27,379,800	24,707,780	4,789,775	-----	10,305.00	-----
1895	22,293,120	5,678,260	6,729,680	-----	15,297.50	-----
1896	15,853,260	763,480	295,315	-----	48,005.00	-----
1897	27,665,220	10,001,590	4,339,415	-----	74,760.00	-----
1898	3,409,400	8,121,970	3,167,475	-----	60,412.50	-----
1899	33,887,680	12,623,050	8,553,645	-----	68,375.00	-----
1900	37,491,680	2,939,600	7,028,650	-----	168,012.50	-----
1901	2,230,520	17,188,250	3,080,200	-----	228,307.50	-----
Total	562,363,500	238,515,740	167,753,615	1,357,716	23,420,222.50	18,223,438

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1901.]

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	\$3,342,490	\$65,225,996.50	\$18,676,790.50	.....	\$6,552,468.50	\$3,648,798.90	\$1,259,066.40
.....	49,625	372,812.50	4,381.25	.....	872.50	536.25	681.75
.....	60,325	212,162.50	5,156.25	.....	662.50	431.25	138.75
.....	182,700	189,100.00	7,500.00	.....	46,625.00	4,295.00	123.00
.....	421,300	397,950.00	4,150.00	.....	25,660.00	10,430.00	153.00
.....	433,000	300,450.00	21,850.00	.....	47,150.00	26,830.00	120.00
.....	1,115,760	582,680.00	42,808.00	.....	75,361.00	74,443.00	127.80
.....	1,106,450	410,775.00	45,737.50	.....	239,645.00	117,397.50	58.50
\$397,500	293,600	1,308,750.00	371,075.00	.....	394,710.00	35,630.00	18.00
987,800	.....	1,180,150.00	117,975.00	.....	294,070.00	.....	.....
218,900	.....	3,013,750.00	1,073,375.00	\$7,940	1,035,070.00	.....	.....
156,150	.....	4,209,575.00	4,454,287.50	3,180	1,146,115.00	.....	.....
3,039,710	.....	4,152,255.00	2,727,927.50	102	731,051.00	.....	.....
900	10,509,550	689,200.00	565,200.00	120	167,880.00	.....	.....
1,541	14,807,100	2,950.00	3,675.00	.....	1,510.00	.....	.....
1,987	12,601,355	4,877.50	3,738.75	.....	3,735.50	.....	.....
960	9,163,975	5,487.50	3,243.75	.....	2,497.50	.....	.....
1,097	11,101,100	2,750.00	4,075.00	.....	391,110.00	.....	.....
979	12,291,039	4,519.50	3,859.75	.....	767,571.20	.....	.....
.....	14,070,875	2,637.50	2,218.75	.....	336,638.00	.....	.....
.....	17,787,767	3,065.00	3,632.50	.....	253,342.70	.....	.....
.....	19,963,886	2,943.00	1,471.50	.....	637,757.00	.....	.....
.....	20,290,710	2,855.00	2,677.50	.....	1,128,393.90	.....	.....
.....	19,183,833	6,416.50	2,708.25	.....	549,648.70	.....	.....
.....	21,726,811	6,355.50	3,177.75	.....	738,071.10	.....	.....
.....	16,802,590	6,295.00	20,147.50	.....	991,154.10	.....	.....
.....	8,694,206	100,300.00	980,150.00	.....	1,531,060.00	.....	.....
.....	1,037,245	^a 942,622.50	2,059,311.25	.....	1,212,124.50	.....	.....
.....	378,792	^b 2,939,448.50	^c 1,371,203.75	.....	334,079.20	.....	.....
.....	110,972	574,486.00	858,243.00	.....	133,097.20	.....	.....
.....	12,880	917,609.00	1,110,220.00	.....	69,088.00	.....	.....
.....	9,976,762	475,381.00	968,690.50	.....	200,076.20	.....	.....
.....	2,822,731	1,240,365.50	2,035,182.75	.....	1,086,926.40	.....	.....
.....	5,884,735	1,478,367.50	2,775,183.75	.....	1,632,073.50	.....	.....
.....	330,846	2,769,423.00	3,156,211.50	.....	1,958,084.60	.....	.....
.....	^d 8,880,912	2,381,456.00	2,504,228.00	.....	1,760,091.20	.....	.....
.....	6,962,813	2,134,406.50	2,223,203.25	.....	1,886,047.80	.....	.....
5,107,524	252,401,735	98,280,624.00	48,214,667.25	11,342	28,361,518.80	3,948,791.90	1,260,487.20

^a Includes Columbian souvenir half dollars, 1892, \$475,000.^b Includes Columbian souvenir half dollars, 1893, \$2,026,052.50.^c Includes Columbian souvenir quarter dollars, 1893, \$10,005.75.^d Includes 50,000 Lafayette souvenir dollars.

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1793-1795			
1796			
1797			
1798			
1799			
1800			
1801			
1802			
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1860			
1861			
1862			
1863			
1864			\$396,950.00
1865		\$341,460.00	272,800.00
1866	\$737,125.00	144,030.00	63,540.00
1867	1,545,475.00	117,450.00	58,775.00
1868	1,440,850.00	97,560.00	56,075.00
1869	819,750.00	48,120.00	30,930.00
Carried forward.....	4,543,200.00	748,620.00	879,070.00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1901.]

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$10,660.33	\$712.67	\$71,485.00	\$370,683.80	\$11,373.00	\$453,541.80
9,747.00	577.40	77,960.00	77,118.50	10,324.40	165,402.90
8,975.10	535.24	128,190.00	14,550.45	9,510.34	152,250.79
9,797.00	-----	205,610.00	330,291.00	9,797.00	545,698.00
9,045.85	60.83	213,285.00	423,515.00	9,106.68	645,906.68
28,221.75	1,057.65	317,760.00	224,296.00	29,279.40	571,335.40
13,628.37	-----	422,570.00	74,758.00	13,628.37	510,956.37
34,351.00	71.83	423,310.00	58,343.00	34,422.83	516,075.83
24,713.53	489.50	258,377.50	87,118.00	25,203.03	370,698.53
7,568.38	5,276.56	258,642.50	100,340.50	12,844.94	371,827.94
9,411.16	4,072.32	170,367.50	149,388.50	13,483.48	333,239.48
3,480.00	1,780.00	324,505.00	471,319.00	5,260.00	801,084.00
7,272.21	2,880.00	437,495.00	597,448.75	9,652.21	1,044,595.96
11,090.00	2,000.00	284,665.00	684,300.00	13,090.00	982,055.00
2,228.67	5,772.86	169,375.00	707,376.00	8,001.53	884,752.53
14,585.00	1,075.00	501,435.00	638,773.50	15,660.00	1,155,868.50
2,180.25	315.70	497,905.00	608,340.00	2,495.95	1,108,740.95
10,755.00	-----	290,435.00	814,029.50	10,755.00	1,115,219.50
4,180.00	-----	477,140.00	620,951.50	4,180.00	1,102,271.50
3,578.30	-----	77,270.00	561,687.50	3,578.30	642,535.80
-----	-----	3,175.00	17,308.00	-----	20,483.00
28,209.82	-----	-----	28,575.75	28,209.82	56,785.57
39,484.00	-----	-----	607,783.50	39,484.00	647,267.50
31,670.00	-----	242,940.00	1,070,454.50	31,670.00	1,345,064.50
26,710.00	-----	258,615.00	1,140,000.00	26,710.00	1,425,325.00
44,075.50	-----	1,319,030.00	501,680.70	44,075.50	1,864,786.20
3,890.00	-----	189,325.00	825,762.45	3,890.00	1,018,977.45
20,723.39	-----	88,980.00	805,806.50	20,723.39	915,509.89
-----	-----	72,425.00	895,550.00	-----	967,975.00
12,620.00	-----	93,200.00	1,752,477.00	12,620.00	1,858,297.00
14,611.00	315.00	156,385.00	1,564,583.00	14,926.00	1,735,894.00
15,174.25	1,170.00	92,245.00	2,002,090.00	16,344.25	2,110,679.25
23,577.32	-----	131,565.00	2,869,200.00	23,577.32	3,024,342.32
22,606.24	3,030.00	140,145.00	1,575,600.00	25,636.24	1,741,381.24
14,145.00	2,435.00	295,717.50	1,994,578.00	16,580.00	2,306,875.50
17,115.00	-----	643,105.00	2,495,400.00	17,115.00	3,155,620.00
33,592.60	11.00	714,270.00	3,175,600.00	33,603.60	3,923,473.60
23,620.00	-----	798,435.00	2,579,000.00	23,620.00	3,401,055.00
27,390.00	770.00	978,550.00	2,759,000.00	28,160.00	3,765,710.00
18,551.00	600.00	3,954,270.00	3,415,002.00	19,151.00	7,388,423.00
38,784.00	705.00	2,186,175.00	3,443,003.00	39,489.00	5,668,667.00
21,110.00	1,990.00	4,135,700.00	3,606,100.00	23,100.00	7,764,900.00
55,583.00	-----	1,148,305.00	2,096,010.00	55,583.00	3,299,898.00
63,702.00	-----	1,622,515.00	2,293,000.00	63,702.00	3,979,217.00
31,286.61	-----	1,040,747.50	1,949,135.50	31,286.61	3,021,169.61
24,627.00	-----	1,207,437.50	1,028,603.00	24,627.00	2,260,667.50
15,973.67	-----	710,475.00	577,750.00	15,973.67	1,304,198.67
23,833.90	-----	960,017.50	1,442,500.00	23,833.90	2,426,351.40
24,283.20	-----	4,062,010.00	2,443,750.00	24,283.20	6,530,043.20
23,987.52	-----	1,782,220.00	1,037,050.00	23,987.52	2,843,257.52
38,948.04	-----	2,574,652.50	803,200.00	38,948.04	3,416,800.54
41,208.00	-----	2,234,655.00	1,347,580.00	41,208.00	3,623,443.00
61,836.69	-----	13,277,020.00	990,450.00	61,836.69	14,329,306.69
64,157.99	-----	2,780,930.00	420,050.00	64,157.99	3,265,137.99
41,785.00	199.32	7,948,332.00	922,950.00	41,984.32	8,913,266.32
44,268.44	199.06	27,756,445.50	409,600.00	44,467.50	28,210,513.00
98,897.07	738.36	52,143,446.00	446,797.00	99,635.43	52,689,878.43
50,630.94	-----	51,505,638.50	847,410.00	50,630.94	52,403,679.44
66,411.31	648.47	36,355,621.00	7,852,571.00	67,059.78	44,275,251.78
42,361.56	276.79	20,049,799.00	5,373,270.00	42,638.35	25,465,707.35
15,748.29	282.50	10,594,454.00	1,419,170.00	16,030.79	12,029,654.79
26,904.63	202.15	10,993,976.00	3,214,240.00	27,106.78	14,235,322.78
177,834.56	175.90	10,817,287.00	4,452,260.00	178,010.46	15,447,557.46
246,000.00	-----	4,578,006.50	4,332,120.00	246,000.00	9,156,126.50
364,000.00	-----	1,430,708.00	1,037,450.00	364,000.00	2,832,158.00
205,660.00	-----	11,885,175.50	681,390.00	205,660.00	12,772,225.50
101,000.00	-----	67,588,150.00	3,107,740.00	101,000.00	70,796,890.00
280,750.00	-----	3,600,037.50	541,691.50	280,750.00	4,422,479.00
498,400.00	-----	2,902,082.00	330,517.80	498,400.00	3,730,999.80
529,737.14	-----	4,163,775.00	248,417.10	926,687.14	5,338,879.24
354,292.86	-----	7,081,607.50	319,755.00	968,552.86	8,369,915.36
98,265.00	-----	14,073,945.00	428,909.25	1,042,960.00	15,545,814.25
98,210.00	-----	5,108,625.00	278,876.25	1,819,910.00	7,207,411.25
102,665.00	-----	2,141,387.50	430,343.00	1,697,150.00	4,268,880.50
64,200.00	-----	3,554,937.50	862,643.00	963,000.00	5,380,580.50
4,680,577.41	39,926.11	411,776,456.00	100,706,382.30	10,891,393.55	523,374,231.85

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
Brought forward.....	\$4, 543, 200. 00	\$748, 620. 00	\$879, 070. 00
1870	240, 300. 00	40, 050. 00	17, 225. 00
1871	28, 050. 00	18, 120. 00	14, 425. 00
1872	301, 800. 00	25, 860. 00	1, 300. 00
1873	227, 500. 00	35, 190. 00	.....
1874	176, 900. 00	23, 700. 00	.....
1875	104, 850. 00	6, 840. 00	.....
1876	126, 500. 00	4, 860. 00	.....
1877 .....	.....	.....	.....
1878	117. 50	70. 50	.....
1879	1, 455. 00	1, 236. 00	.....
1880	997. 75	748. 65	.....
1881	3, 618. 75	32, 417. 25	.....
1882	573, 830. 00	759. 00	.....
1883	1, 148, 471. 05	318. 27	.....
1884	563, 697. 10	169. 26	.....
1885	73, 824. 50	143. 70	.....
1886	166, 514. 50	128. 70	.....
1887	763, 182. 60	238. 83	.....
1888	536, 024. 15	1, 232. 49	.....
1889	794, 068. 05	646. 83	.....
1890	812, 963. 60	.....	.....
1891	841, 717. 50	.....	.....
1892	584, 982. 10	.....	.....
1893	668, 509. 75	.....	.....
1894	270, 656. 60	.....	.....
1895	498, 994. 20	.....	.....
1896	442, 146. 00	.....	.....
1897	1, 021, 436. 75	.....	.....
1898	626, 604. 35	.....	.....
1899	1, 301, 451. 55	.....	.....
1900	1, 362, 799. 75	.....	.....
1901	1, 324, 010. 65	.....	.....
Total.....	20, 131, 173. 75	941, 349. 48	912, 020. 00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1901.]

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$4,680,577.44	\$39,926.11	\$411,776,456.00	\$100,706,382.30	\$10,891,393.55	\$523,374,231.85
52,750.00	3,177,552.50	829,400.00	350,325.00	4,357,277.50
39,295.00	1,658,245.00	1,891,179.80	99,890.00	3,649,314.80
40,420.00	5,079,745.00	1,980,063.50	369,380.00	7,429,188.50
116,765.00	35,337,537.50	2,801,283.00	379,455.00	38,518,275.50
141,875.00	8,219,270.00	2,579,995.00	342,475.00	11,141,740.00
135,280.00	5,918,630.00	5,349,035.00	246,970.00	11,514,635.00
79,440.00	11,706,737.50	10,269,307.50	210,800.00	22,186,845.00
8,525.00	7,979,844.00	10,651,045.50	8,525.00	18,639,414.50
57,998.50	13,235,242.00	11,932,850.00	58,186.50	25,226,278.50
162,312.00	9,744,645.00	14,816,776.00	165,003.00	24,726,424.00
389,649.55	33,322,294.00	12,615,693.75	391,395.95	46,329,383.70
392,115.75	67,372,810.00	9,176,163.75	428,151.75	76,977,125.50
385,811.00	35,849,960.00	11,500,132.00	960,400.00	48,310,492.00
455,981.09	3,273,960.00	13,067,968.45	1,604,770.41	17,946,698.86
232,617.42	1,740,216.50	14,412,369.25	796,483.78	16,949,069.53
117,653.81	5,576,512.50	18,047,807.20	191,622.04	23,815,941.74
176,542.90	4,345,542.00	20,606,057.50	343,186.10	25,294,785.60
452,264.83	582,383.00	21,424,636.40	1,215,686.26	23,222,705.66
374,944.14	6,018,958.00	19,742,606.45	912,200.78	26,673,765.23
488,693.61	1,047,031.00	22,474,415.35	1,283,408.49	24,804,854.84
571,828.54	2,144,002.50	17,820,186.60	1,384,792.14	21,348,981.24
470,723.50	1,282,185.00	11,305,716.00	1,312,441.00	13,900,342.00
376,498.32	11,840,202.50	5,251,303.25	961,480.42	18,052,986.17
466,421.95	33,011,980.00	5,023,523.45	1,134,931.70	39,170,435.15
167,521.32	56,887,660.00	1,676,798.20	438,177.92	59,002,636.12
383,436.36	34,716,357.50	2,109,797.00	882,430.56	37,708,585.06
390,572.93	16,960,060.00	11,620,909.70	832,718.93	29,413,688.63
504,663.30	42,080,985.00	7,185,205.65	1,526,100.05	50,792,290.70
498,230.79	14,759,257.50	11,770,359.75	1,124,835.14	27,654,452.39
536,000.31	54,632,750.00	8,214,565.10	1,837,451.86	64,684,766.96
668,337.64	47,627,942.50	15,526,687.20	2,031,137.39	65,185,767.09
796,111.43	22,727,277.50	13,206,470.55	2,120,122.08	38,053,870.13
14,811,858.46	39,926.11	1,011,634,231.50	437,586,690.15	36,836,327.80	1,486,057,249.45

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at San Francisco]

Calendar years.	GOLD.						SILVER.	
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	Dollars.	Trade dollars.
1854.....	\$2,823,360	\$1,238,260	\$1,340	.....	\$615	\$14,632	.....	.....
1855.....	17,593,500	90,000	305,000	\$19,800	.....	.....	.....	.....
1856.....	23,795,000	680,000	525,500	103,500	177,800	24,600	.....	.....
1857.....	19,410,000	260,000	435,000	42,000	170,000	10,000	.....	.....
1858.....	16,934,200	118,000	93,000	.....	3,000	10,000	.....	.....
1859.....	12,728,900	70,000	66,100	.....	38,000	15,000	\$20,000	.....
1860.....	10,899,000	50,000	106,000	21,000	89,000	13,000	.....	.....
1861.....	15,360,000	155,000	90,000	.....	60,000	.....	.....	.....
1862.....	17,083,460	125,000	47,500	.....	20,000	.....	.....	.....
1863.....	19,331,400	100,000	85,000	.....	27,000	.....	.....	.....
1864.....	15,873,200	25,000	19,440	.....	.....	.....	.....	.....
1865.....	20,850,000	167,000	138,060	.....	58,440	.....	.....	.....
1866.....	16,845,000	200,000	219,600	.....	97,400	.....	.....	.....
1867.....	18,415,000	90,000	145,000	.....	70,000	.....	.....	.....
1868.....	16,750,000	135,000	260,000	.....	85,000	.....	.....	.....
1869.....	13,735,000	64,300	155,000	.....	73,750	.....	.....	.....
1870.....	19,640,000	80,000	85,000	.....	40,000	3,000	.....	.....
1871.....	18,560,000	165,000	125,000	.....	55,000	.....	.....	.....
1872.....	15,600,000	173,000	182,000	.....	45,000	.....	9,000	.....
1873.....	20,812,000	120,000	155,000	.....	67,500	.....	700	\$703,000
1874.....	24,280,000	100,000	80,000	.....	.....	.....	.....	2,549,000
1875.....	24,600,000	.....	45,000	.....	29,000	.....	.....	4,487,000
1876.....	31,940,000	50,000	20,000	.....	12,500	.....	.....	5,227,000
1877.....	34,700,000	170,000	133,500	.....	88,500	.....	.....	9,519,000
1878.....	34,780,000	261,000	723,500	.....	445,000	.....	9,774,000	4,162,000
1879.....	24,476,000	2,240,000	2,131,000	.....	108,750	.....	9,110,000	.....
1880.....	16,720,000	5,062,500	6,744,500	.....	.....	.....	8,900,000	.....
1881.....	14,540,000	9,700,000	4,845,000	.....	.....	.....	12,760,000	.....
1882.....	22,500,000	1,320,000	4,845,000	.....	.....	.....	9,250,000	.....
1883.....	23,780,000	380,000	416,000	.....	.....	.....	6,250,000	.....
1884.....	18,320,000	1,242,500	885,000	.....	.....	.....	3,200,000	.....
1885.....	13,670,000	2,280,000	6,057,500	.....	.....	.....	1,497,000	.....
1886.....	.....	8,260,000	16,340,000	.....	.....	.....	750,000	.....
1887.....	5,660,000	8,170,000	9,560,000	.....	.....	.....	1,771,000	.....
1888.....	17,192,000	6,487,000	1,469,500	.....	.....	.....	657,000	.....
1889.....	15,494,000	4,254,000	.....	.....	.....	.....	700,000	.....
1890.....	16,055,000	.....	.....	.....	.....	.....	8,230,373	.....
1891.....	25,762,500	.....	.....	.....	.....	.....	5,296,000	.....
1892.....	18,603,000	1,155,000	1,492,000	.....	.....	.....	1,200,000	.....
1893.....	19,923,500	1,413,500	1,120,000	.....	.....	.....	100,000	.....
1894.....	20,971,000	250,000	279,500	.....	.....	.....	1,260,000	.....
1895.....	22,870,000	490,000	560,000	.....	.....	.....	400,000	.....
1896.....	28,078,500	1,237,500	777,000	.....	.....	.....	5,000,000	.....
1897.....	29,405,000	2,347,500	1,770,000	.....	.....	.....	5,825,000	.....
1898.....	51,503,500	4,736,000	6,987,000	.....	.....	.....	4,102,000	.....
1899.....	40,206,000	8,410,000	7,725,000	.....	.....	.....	2,562,000	.....
1900.....	49,190,000	810,000	1,645,000	.....	.....	.....	3,540,000	.....
1901.....	31,920,000	28,127,500	18,240,000	.....	.....	.....	2,284,000	.....
Total	1,010,185,020	103,059,560	98,129,540	186,300	1,861,255	90,232	104,448,073	26,647,000

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

from its organization, 1854, to December 31, 1901.]

SILVER.					TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Gold.	Silver.	
					\$4,084,207		\$4,084,207.00
\$64,975.00	\$99,100.00				18,008,300	\$164,075.00	18,172,375.00
105,500.00	71,500.00		\$7,000.00		25,306,400	184,000.00	25,490,400.00
79,000.00	20,500.00				20,327,000	99,500.00	20,426,500.00
238,000.00	30,250.00		6,000.00		17,158,200	274,250.00	17,432,450.00
283,000.00	20,000.00		6,000.00		12,918,000	329,000.00	13,247,000.00
236,000.00	14,000.00		14,000.00		11,178,000	264,000.00	11,442,000.00
469,750.00	24,000.00		17,250.00		15,665,000	511,000.00	16,176,000.00
676,000.00	16,750.00		18,075.00		17,275,960	710,825.00	17,986,785.00
458,000.00			15,750.00	\$5,000	19,543,400	478,750.00	20,022,150.00
329,000.00	5,000.00		23,000.00	4,500	15,917,640	361,500.00	16,279,140.00
337,500.00	10,250.00		17,500.00	6,000	21,213,500	371,250.00	21,584,750.00
527,000.00	7,000.00		13,500.00	6,000	17,362,000	553,500.00	17,915,500.00
598,000.00	12,000.00		14,000.00	6,000	18,720,000	630,000.00	19,350,000.00
580,000.00	24,000.00		26,000.00	14,000	17,230,000	644,000.00	17,874,000.00
328,000.00	19,000.00		45,000.00	11,500	14,028,050	403,500.00	14,431,550.00
502,000.00			5,000.00		19,848,000	507,000.00	20,355,000.00
1,089,000.00	7,725.00		32,000.00	8,050	18,905,000	1,136,775.00	20,041,775.00
290,000.00	20,750.00		19,000.00	41,850	16,000,000	380,600.00	16,380,600.00
116,500.00	39,000.00		45,500.00	16,200	21,154,500	920,900.00	22,075,400.00
197,000.00	98,000.00		24,000.00		24,460,000	2,868,000.00	27,328,000.00
1,600,000.00	170,000.00	\$231,000	907,000.00		24,674,000	7,395,000.00	32,069,000.00
2,264,000.00	2,149,000.00		1,042,000.00		32,022,500	10,682,000.00	42,704,500.00
2,678,000.00	2,249,000.00		234,000.00		35,092,000	14,680,000.00	49,772,000.00
6,000.00	35,000.00				36,209,500	13,977,000.00	50,186,500.00
					28,955,750	9,110,000.00	38,065,750.00
					28,527,000	8,900,000.00	37,427,000.00
					29,085,000	12,760,000.00	41,845,000.00
					28,665,000	9,250,000.00	37,915,000.00
					24,576,000	6,250,000.00	30,826,000.00
			56,496.90		20,447,500	3,256,496.90	23,703,996.90
			4,369.00		22,007,500	1,501,369.00	23,508,869.00
			20,652.40		24,600,000	770,652.40	25,370,652.40
			445,445.00		23,390,000	2,216,445.00	25,606,445.00
	304,000.00		172,000.00		25,148,500	1,133,000.00	26,281,500.00
			97,267.80		19,748,000	797,267.80	20,545,267.80
			142,307.60		16,055,000	8,372,680.60	24,427,680.60
	554,000.00		319,611.60		25,762,500	6,169,611.60	31,932,111.60
514,514.00	241,019.75		99,071.00		21,250,000	2,054,604.75	23,304,604.75
370,000.00	363,633.75		249,140.10		22,457,000	1,082,773.85	23,539,773.85
2,024,345.00	662,205.25		2.40		21,500,500	3,946,552.65	25,447,052.65
554,043.00	441,170.25		112,000.00		23,920,000	1,507,213.25	25,427,213.25
570,474.00	47,009.75		57,505.60		30,093,000	5,674,989.35	35,767,989.35
466,950.00	135,557.25		134,284.40		33,522,500	6,561,791.65	40,084,291.65
1,179,275.00	255,148.00		170,250.70		63,226,500	5,706,673.70	68,933,173.70
843,205.50	177,000.00		186,749.30		56,341,000	3,768,954.80	60,109,954.80
1,280,161.00	464,646.25		516,827.00		51,645,000	5,801,634.25	57,446,634.25
423,522.00	18,166.00		59,302.20		78,287,500	2,784,990.20	81,072,490.20
22,278,714.50	8,805,381.25	231,000	5,374,858.00	119,100	1,213,511,907	167,904,126.75	1,381,416,033.75

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at New Orleans from its organization, 1838, to

Calendar years.	GOLD.						SILVER.
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	Dollars.
1838							
1839							
1840			\$152,000		\$44,452.50		
1841		\$25,000	41,750		65,500.00		
1842		274,000	82,000		18,450.00		
1843		1,751,620	505,375		49,500.00		
1844		1,187,000	1,823,000		920,005.00		
1845		475,000	205,000				
1846		817,800	290,000		165,000.00		\$59,000
1847		5,715,000	60,000		310,000.00		
1848		358,500					
1849		239,000				\$215,000	
1850	\$2,820,000	575,000			210,000.00	14,000	40,000
1851	6,300,000	2,630,000	205,000		370,000.00	290,000	
1852	3,800,000	180,000			350,000.00	140,000	
1853	1,420,000	510,000				290,000	
1854	65,000	525,000	230,000	\$72,000	382,500.00		
1855	160,000	180,000	55,500			55,000	
1856	45,000	145,000	50,000		52,750.00		
1857	600,000	55,000	65,000		85,000.00		
1858	705,000	200,000					
1859	182,000	23,000					360,000
1860	132,000	111,000					515,000
1861 ^a	100,000						
1879	46,500	15,000					2,887,000
1880		92,000					5,305,000
1881		83,500					5,708,000
1882		108,200					6,090,000
1883		8,000					8,725,000
1884							9,730,000
1885							9,185,000
1886							10,710,000
1887							11,550,000
1888		213,350					12,150,000
1889							11,875,000
1890							10,701,000
1891							7,954,529
1892		286,880	50,000				2,744,000
1893		170,000	550,000				300,000
1894		1,075,000	83,000				1,723,000
1895		980,000					450,000
1896							4,900,000
1897		425,000					4,004,000
1898							4,440,000
1899		370,470					12,290,000
1900							12,590,000
1901		720,410					13,320,000
Total	16,375,500	20,524,730	4,447,625	72,000	3,023,157.50	1,004,000	170,305,529

^aNo coinage from 1862 to 1878, inclusive.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its suspension, 1861, and from its reopening, 1879, to December 31, 1901.]

SILVER.					TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Dimes.	Half dimes.	Three cents.	Gold.	Silver.	
		\$40, 243. 40				\$40, 243. 40	\$40, 243. 40
\$81, 488		124, 327. 20	\$54, 827. 50		\$44, 452. 50	260, 642. 70	305, 095. 20
427, 550	\$106, 300	117, 500. 00	46, 750. 00		217, 500. 00	698, 100. 00	915, 600. 00
200, 500	113, 000	200, 750. 00	40, 750. 00		85, 200. 00	555, 000. 00	640, 200. 00
478, 500	192, 250	202, 000. 00	17, 500. 00		405, 500. 00	890, 250. 00	1, 295, 750. 00
1, 134, 000	242, 000	15, 000. 00			3, 177, 000. 00	1, 391, 000. 00	4, 568, 000. 00
1, 002, 500	185, 000		11, 000. 00		3, 010, 000. 00	1, 198, 500. 00	4, 208, 500. 00
1, 047, 000		23, 000. 00			680, 000. 00	1, 070, 000. 00	1, 750, 000. 00
1, 152, 000					1, 272, 800. 00	1, 211, 000. 00	2, 483, 800. 00
1, 292, 000	92, 000				6, 085, 000. 00	1, 384, 000. 00	7, 469, 000. 00
1, 590, 000			30, 000. 00		358, 500. 00	1, 620, 000. 00	1, 978, 500. 00
1, 155, 000		30, 000. 00	7, 000. 00		454, 000. 00	1, 192, 000. 00	1, 646, 000. 00
1, 228, 000	103, 000	51, 000. 00	34, 500. 00		3, 619, 000. 00	1, 456, 500. 00	5, 075, 500. 00
201, 000	22, 000	40, 000. 00	43, 000. 00	\$21, 600	9, 795, 000. 00	327, 600. 00	10, 122, 600. 00
72, 000	24, 000	43, 000. 00	13, 000. 00		4, 470, 000. 00	152, 000. 00	4, 622, 000. 00
664, 000	333, 000	110, 000. 00	118, 000. 00		2, 220, 000. 00	1, 225, 000. 00	3, 445, 000. 00
2, 620, 000	371, 000	177, 000. 00	78, 000. 00		1, 274, 500. 00	3, 246, 000. 00	4, 520, 500. 00
1, 844, 000	44, 000		30, 000. 00		450, 500. 00	1, 918, 000. 00	2, 368, 500. 00
1, 329, 000	242, 000	118, 000. 00	55, 000. 00		292, 750. 00	1, 744, 000. 00	2, 036, 750. 00
409, 000	295, 000	154, 000. 00	69, 000. 00		805, 000. 00	927, 000. 00	1, 732, 000. 00
3, 647, 000	130, 000	29, 000. 00	83, 000. 00		905, 000. 00	3, 889, 000. 00	4, 794, 000. 00
1, 417, 000	65, 000	48, 000. 00	28, 000. 00		205, 000. 00	1, 918, 000. 00	2, 123, 000. 00
645, 000	97, 000	4, 000. 00	53, 000. 00		243, 000. 00	1, 314, 000. 00	1, 557, 000. 00
165, 000					100, 000. 00	165, 000. 00	265, 000. 00
					61, 500. 00	2, 887, 000. 00	2, 948, 500. 00
					92, 000. 00	5, 305, 000. 00	5, 397, 000. 00
					83, 500. 00	5, 708, 000. 00	5, 791, 500. 00
					108, 200. 00	6, 090, 000. 00	6, 198, 200. 00
					8, 000. 00	8, 725, 000. 00	8, 733, 000. 00
						9, 730, 000. 00	9, 730, 000. 00
						9, 185, 000. 00	9, 185, 000. 00
						10, 710, 000. 00	10, 710, 000. 00
						11, 550, 000. 00	11, 550, 000. 00
					213, 350. 00	12, 150, 000. 00	12, 363, 350. 00
						11, 875, 000. 00	11, 875, 000. 00
						10, 701, 000. 00	10, 701, 000. 00
	17, 000	454, 000. 00				8, 425, 529. 00	8, 425, 529. 00
195, 000	660, 000	384, 170. 00			336, 880. 00	3, 983, 170. 00	4, 320, 050. 00
694, 500	849, 000	176, 000. 00			720, 000. 00	2, 019, 500. 00	2, 739, 500. 00
1, 069, 000	713, 000	72, 000. 00			1, 158, 000. 00	3, 577, 000. 00	4, 735, 000. 00
883, 000	704, 000	44, 000. 00			980, 000. 00	2, 081, 000. 00	3, 061, 000. 00
462, 000	371, 000	61, 000. 00				5, 794, 000. 00	5, 794, 000. 00
316, 000	353, 700	66, 600. 00			425, 000. 00	4, 740, 300. 00	5, 165, 300. 00
437, 000	467, 000	213, 000. 00				5, 557, 000. 00	5, 557, 000. 00
862, 000	661, 000	265, 000. 00			370, 470. 00	14, 078, 000. 00	14, 448, 470. 00
1, 372, 000	854, 000	201, 000. 00				15, 017, 000. 00	15, 017, 000. 00
562, 000	403, 000	562, 000. 00			720, 410. 00	14, 847, 000. 00	15, 567, 410. 00
30, 654, 038	8, 709, 250	4, 025, 590. 60	812, 327. 50	21, 600	45, 447, 012. 50	214, 528, 335. 10	259, 975, 347. 60

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Carson City,

Calendar years.	GOLD.			SILVER.	
	Double eagles.	Eagles.	Half eagles.	Dollars.	Trade dollars.
1870.....	\$75,780	\$59,080	\$38,375	\$12,462	.....
1871.....	293,740	71,850	103,850	1,376	.....
1872.....	593,000	55,000	84,900	3,150	.....
1873.....	448,200	45,430	37,080	2,300	\$124,500
1874.....	2,301,700	167,670	105,990	.....	1,373,200
1875.....	2,223,020	77,150	59,140	.....	1,573,700
1876.....	2,768,820	46,960	34,435	.....	509,000
1877.....	851,300	33,320	43,400	.....	534,000
1878.....	263,600	32,440	45,270	2,212,000	97,000
1879.....	214,160	17,620	86,405	756,000	.....
1880.....	.....	111,900	255,085	591,000	.....
1881.....	.....	240,150	69,430	296,000	.....
1882.....	782,800	67,640	414,085	1,133,000	.....
1883.....	1,199,240	120,000	64,790	1,204,000	.....
1884.....	1,622,780	99,250	82,010	1,136,000	.....
1885.....	189,000	.....	.....	228,000	.....
1886 ^a.....	.....	.....	.....	.....	.....
1887 ^a.....	.....	.....	.....	.....	.....
1888 ^a.....	.....	.....	.....	.....	.....
1889 ^b	618,900	.....	.....	350,000	.....
1890.....	1,824,180	175,000	269,000	2,309,041	.....
1891.....	100,000	1,037,320	1,040,000	1,618,000	.....
1392.....	545,300	400,000	414,840	1,352,000	.....
1893 ^c	368,040	140,000	300,000	677,000	.....
Total	17,283,560	2,997,780	3,548,085	13,881,329	4,211,400

^a Coinage suspended. ^b Operations resumed October 1, 1889.

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Charlotte, N. C., from its organization, 1838, to its suspension, 1861.]

Calendar years.	GOLD.			TOTAL VALUE.
	Half eagles.	Quarter eagles.	Dollars.	
1838.....	\$64,565	\$19,770.00	.....	\$84,335.00
1839.....	117,335	45,432.50	.....	162,767.50
1840.....	95,140	32,095.00	.....	127,235.00
1841.....	107,555	25,742.50	.....	133,297.50
1842.....	137,400	16,842.50	.....	154,242.50
1843.....	221,765	65,240.00	.....	287,005.00
1844 ^a	118,155	29,055.00	.....	147,210.00
1845 ^b.....	.....	.....	.....	.....
1846.....	64,975	12,020.00	.....	76,995.00
1847.....	420,755	58,065.00	.....	478,820.00
1848.....	322,360	41,970.00	.....	364,330.00
1849.....	324,115	25,550.00	\$11,634	361,299.00
1850.....	317,955	22,870.00	6,966	347,791.00
1851.....	215,880	37,307.50	41,267	324,451.50
1852.....	362,870	24,430.00	9,434	396,734.00
1853.....	327,855	.....	11,515	339,370.00
1854.....	196,455	18,237.50	4	214,696.50
1855.....	198,940	9,192.50	9,803	217,935.50
1856.....	142,285	19,782.50	.....	162,067.50
1857.....	156,800	.....	13,280	170,080.00
1858.....	194,280	22,640.00	.....	216,920.00
1859.....	159,235	.....	5,235	164,470.00
1860.....	74,065	18,672.50	.....	92,737.50
1861.....	34,395	.....	.....	34,395.00
Total.....	4,405,135	544,915.00	109,138	5,059,188.00

^a Mint burned July 27, 1844. ^b No coinage.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

from its organization, 1870, to June 30, 1893.]

SILVER.				TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Gold.	Silver.	
\$27,308.50	\$2,085.00	.....	.....	\$173,235	\$41,855.50	\$215,090.50
69,975.00	2,722.50	.....	\$2,010.00	469,440	76,083.50	545,523.50
136,000.00	2,275.00	.....	2,400.00	732,900	143,825.00	876,725.00
168,530.00	4,115.50	.....	3,119.10	530,710	302,564.60	833,274.60
29,500.00	.....	.....	1,081.70	2,575,360	1,403,781.70	3,979,141.70
504,000.00	35,000.00	\$26,658	464,500.00	2,359,310	2,603,858.00	4,963,168.00
978,000.00	1,236,000.00	2,000	827,000.00	2,850,215	3,552,000.00	6,402,215.00
710,000.00	1,048,000.00	.....	770,000.00	928,020	3,062,000.00	3,990,020.00
31,000.00	249,000.00	.....	20,000.00	341,310	2,609,000.00	2,950,310.00
.....	.....	.....	.....	318,185	756,000.00	1,074,185.00
.....	.....	.....	.....	366,985	591,000.00	957,985.00
.....	.....	.....	.....	309,580	296,000.00	605,580.00
.....	.....	.....	.....	1,264,525	1,133,000.00	2,397,525.00
.....	.....	.....	.....	1,384,030	1,204,000.00	2,588,030.00
.....	.....	.....	.....	1,801,040	1,136,000.00	2,940,040.00
.....	.....	.....	.....	189,000	228,000.00	417,000.00
.....
.....	.....	.....	.....	618,900	350,000.00	968,900.00
.....	.....	.....	.....	2,268,180	2,309,041.00	4,577,221.00
.....	.....	.....	.....	2,177,320	1,618,000.00	3,795,320.00
.....	.....	.....	.....	1,360,140	1,352,000.00	2,712,140.00
.....	.....	.....	.....	808,040	677,000.00	1,485,040.00
2,654,313.50	2,579,198.00	28,658	2,090,110.80	23,829,425	25,445,009.30	49,274,434.30

° Coinage suspended from May 23, 1893.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

[Coinage of the mint at Dahlonega, Ga., from its organization, 1838, to its suspension, 1861.]

Calendar years.	GOLD.				TOTAL VALUE.
	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	
1838.....	\$102,915	.....	.....	.....	\$102,915.00
1839.....	94,695	.....	\$34,185.00	.....	128,880.00
1840.....	114,480	.....	8,830.00	.....	123,310.00
1841.....	152,475	.....	10,410.00	.....	162,885.00
1842.....	298,040	.....	11,607.50	.....	309,647.50
1843.....	492,260	.....	90,522.50	.....	582,782.50
1844.....	444,910	.....	43,330.00	.....	488,240.00
1845.....	453,145	.....	48,650.00	.....	501,795.00
1846.....	401,470	.....	48,257.50	.....	449,727.50
1847.....	322,025	.....	39,460.00	.....	361,485.00
1848.....	237,325	.....	34,427.50	.....	271,752.50
1849.....	195,180	.....	27,362.50	\$21,588	244,130.50
1850.....	219,750	.....	30,370.00	8,382	258,502.00
1851.....	313,550	.....	28,160.00	9,882	351,592.00
1852.....	457,260	.....	10,195.00	6,360	473,815.00
1853.....	448,390	.....	7,945.00	6,583	462,918.00
1854.....	282,065	\$3,360	4,400.00	2,935	292,760.00
1855.....	112,160	.....	2,807.50	1,811	116,778.50
1856.....	98,930	.....	2,185.00	1,460	102,575.00
1857.....	85,230	.....	5,910.00	3,533	94,673.00
1858.....	76,810	.....	.....	3,477	80,287.00
1859.....	51,880	.....	5,616.00	4,952	62,392.00
1860.....	73,175	.....	.....	1,566	74,741.00
1861.....	7,985	.....	.....	.....	7,985.00
Total.....	5,536,055	3,360	494,625.00	72,529	6,106,569.00

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION.

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three-dollars.	Quarter eagles.	Dollars.
1793-95.....		\$27, 950	\$43, 535			
1796.....		60, 800	16, 995		\$165. 00	
1797.....		91, 770	32, 030		4, 390. 00	
1798.....		79, 740	124, 335		1, 535. 00	
1799.....		174, 830	37, 255		1, 200. 00	
1800.....		259, 650	58, 110			
1801.....		292, 540	130, 030			
1802.....		150, 900	265, 880		6, 530. 00	
1803.....		89, 790	167, 530		1, 057. 50	
1804.....		97, 950	152, 375		8, 317. 50	
1805.....			165, 915		4, 452. 50	
1806.....			320, 465		4, 040. 00	
1807.....			420, 465		17, 030. 00	
1808.....			277, 890		6, 775. 00	
1809.....			169, 375			
1810.....			501, 435			
1811.....			497, 905			
1812.....			290, 435			
1813.....			477, 140			
1814.....			77, 270			
1815.....			3, 175			
1816.....						
1817.....						
1818.....			242, 940			
1819.....			258, 615			
1820.....			1, 319, 030			
1821.....			173, 205		16, 120. 00	
1822.....			88, 980			
1823.....			72, 425			
1824.....			86, 700		6, 500. 00	
1825.....			145, 300		11, 085. 00	
1826.....			90, 345		1, 900. 00	
1827.....			124, 565		7, 000. 00	
1828.....			140, 145			
1829.....			287, 210		8, 507. 50	
1830.....			631, 755		11, 350. 00	
1831.....			702, 970		11, 300. 00	
1832.....			787, 435		11, 000. 00	
1833.....			968, 150		10, 400. 00	
1834.....			3, 660, 845		293, 425. 00	
1835.....			1, 857, 670		328, 505. 00	
1836.....			2, 765, 735		1, 369, 965. 00	
1837.....			1, 035, 605		112, 700. 00	
1838.....		72, 000	1, 600, 420		137, 345. 00	
1839.....		382, 480	802, 745		191, 622. 50	
1840.....		473, 380	1, 048, 530		153, 572. 50	
1841.....		656, 310	380, 945		54, 602. 50	
1842.....		1, 089, 070	655, 330		85, 007. 50	
1843.....		2, 506, 240	4, 275, 425		1, 327, 132. 50	
1844.....		1, 250, 610	4, 087, 715		89, 345. 00	
1845.....		736, 530	2, 743, 640		276, 277. 50	
1846.....		1, 018, 750	2, 736, 155		279, 272. 50	
1847.....		14, 337, 580	5, 382, 685		482, 060. 00	
1848.....		1, 813, 340	1, 863, 560		98, 612. 50	
1849.....		6, 775, 180	1, 184, 645		111, 147. 50	\$936, 789
1850.....	\$26, 225, 220	3, 489, 510	860, 160		895, 547. 50	511, 301
1851.....	48, 043, 100	4, 393, 280	2, 651, 955		3, 867, 337. 50	3, 658, 820
1852.....	44, 860, 520	2, 811, 060	3, 689, 635		3, 283, 827. 50	2, 201, 145
1853.....	26, 646, 520	2, 522, 530	2, 305, 095		3, 519, 615. 00	4, 384, 149
1854.....	18, 052, 340	2, 305, 760	1, 513, 235	\$491, 214	1, 896, 397. 50	1, 657, 016
1855.....	25, 046, 820	1, 487, 010	1, 257, 090	171, 465	600, 700. 00	824, 883
1856.....	30, 437, 560	1, 429, 900	1, 806, 665	181, 530	1, 213, 117. 50	1, 788, 996
1857.....	28, 797, 500	481, 060	1, 232, 970	104, 673	796, 235. 00	801, 602
1858.....	21, 873, 480	343, 210	439, 770	6, 399	144, 082. 50	131, 472
1859.....	13, 782, 840	253, 930	361, 235	46, 914	142, 220. 00	193, 431
1860.....	22, 584, 400	278, 830	352, 365	42, 465	164, 360. 00	51, 234
1861.....	74, 989, 060	1, 287, 330	3, 332, 130	18, 216	3, 241, 295. 00	527, 499
1862.....	18, 926, 120	234, 950	69, 825	17, 355	300, 882. 50	1, 326, 865
1863.....	22, 187, 200	112, 480	97, 360	15, 117	27, 075. 00	6, 250
1864.....	19, 958, 900	60, 800	40, 540	8, 040	7, 185. 00	5, 950
1865.....	27, 874, 000	207, 050	144, 535	3, 495	62, 302. 50	3, 725
1866.....	30, 820, 500	237, 800	253, 200	12, 090	105, 175. 00	7, 180
1867.....	23, 436, 300	121, 400	179, 600	7, 950	78, 125. 00	5, 250
1868.....	18, 722, 000	241, 550	288, 625	14, 625	94, 062. 50	10, 525
1869.....	17, 238, 100	82, 850	163, 925	7, 575	84, 612. 50	5, 925
Carried forward.....	560, 502, 480	54, 819, 680	67, 470, 880	1, 149, 123	26, 065, 402. 50	19, 040, 007

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
	\$204, 791	\$161, 572. 00				\$4, 320. 80	
	72, 920		\$1, 473. 50		\$2, 213. 50	511. 50	
	7, 776	1, 959. 00	63. 00		2, 526. 10	2, 226. 35	
	327, 536				2, 755. 00		
	423, 515						
	220, 920				2, 176. 00	1, 200. 00	
	54, 454	15, 144. 50			3, 464. 00	1, 695. 50	
	41, 650	14, 945. 00			1, 097. 50	650. 50	
	66, 064	15, 857. 50			3, 304. 00	1, 892. 50	
	19, 570	78, 259. 50	1, 684. 50		826. 50		
	321	105, 861. 00	30, 348. 50		12, 078. 00	780. 00	
		419, 788. 00	51, 531. 00				
		525, 788. 00	55, 160. 75		16, 500. 00		
		684, 300. 00					
		702, 905. 00			4, 471. 00		
		638, 138. 00			635. 50		
		601, 822. 00			6, 518. 00		
		814, 029. 50					
		620, 951. 50					
		519, 537. 50			42, 150. 00		
			17, 308. 00				
		23, 575. 00	5, 000. 75				
		607, 783. 50					
		980, 161. 00	90, 293. 50				
		1, 104, 000. 00	36, 000. 00				
		375, 561. 00	31, 861. 00		94, 258. 70		
		652, 898. 50	54, 212. 75		118, 651. 20		
		779, 786. 50	16, 020. 00		10, 000. 00		
		847, 100. 00	4, 450. 00		44, 000. 00		
		1, 752, 477. 00					
		1, 471, 583. 00	42, 000. 00		51, 000. 00		
		2, 002, 090. 00					
		2, 746, 700. 00	1, 000. 00		121, 500. 00		
		1, 537, 600. 00	25, 500. 00		12, 500. 00		
		1, 856, 078. 00			77, 000. 00	61, 500. 00	
		2, 382, 400. 00			51, 000. 00	62, 000. 00	
		2, 936, 830. 00	99, 500. 00		77, 135. 00	62, 135. 00	
		2, 398, 500. 00	80, 000. 00		52, 250. 00	48, 250. 00	
		2, 603, 000. 00	39, 000. 00		48, 500. 00	68, 500. 00	
		3, 206, 002. 00	71, 500. 00		63, 500. 00	74, 000. 00	
		2, 676, 003. 00	488, 000. 00		141, 000. 00	138, 000. 00	
	1, 000	3, 273, 100. 00	118, 000. 00		119, 000. 00	95, 000. 00	
		1, 814, 910. 00	63, 100. 00		104, 200. 00	113, 800. 00	
		1, 773, 000. 00	208, 000. 00		239, 493. 40	112, 750. 00	
	300	1, 748, 768. 00	122, 786. 50		229, 638. 70	108, 285. 00	
	61, 005	1, 145, 054. 00	153, 331. 75		253, 358. 00	113, 954. 25	
	173, 000	355, 500. 00	143, 000. 00		363, 000. 00	98, 250. 00	
	184, 618	1, 484, 882. 00	214, 250. 00		390, 750. 00	58, 250. 00	
	165, 100	3, 056, 000. 00	403, 400. 00		152, 000. 00	58, 250. 00	
	20, 000	1, 885, 500. 00	290, 300. 00		7, 250. 00	32, 500. 00	
	24, 500	1, 341, 500. 00	230, 500. 00		198, 500. 00	78, 200. 00	
	169, 600	2, 257, 000. 00	127, 500. 00		3, 130. 00	1, 350. 00	
	140, 750	1, 870, 000. 00	275, 500. 00		24, 500. 00	63, 700. 00	
	15, 000	1, 880, 000. 00	36, 500. 00		45, 150. 00	63, 400. 00	
	62, 600	1, 781, 000. 00	85, 000. 00		113, 900. 00	72, 450. 00	
	47, 500	1, 341, 500. 00	150, 700. 00		244, 150. 00	82, 250. 00	
	1, 300	301, 375. 00	62, 000. 00		142, 650. 00	82, 050. 00	\$185, 022. 00
	1, 100	110, 565. 00	68, 265. 00		196, 550. 00	63, 025. 00	559, 905. 00
	46, 110	2, 430, 354. 00	4, 146, 555. 00		1, 327, 301. 00	785, 251. 00	342, 000. 00
	33, 140	4, 111, 000. 00	3, 466, 000. 00		624, 000. 00	365, 000. 00	20, 130. 00
	26, 000	2, 288, 725. 00	857, 350. 00		207, 500. 00	117, 500. 00	4, 170. 00
	63, 500	1, 903, 500. 00	2, 129, 500. 00		703, 000. 00	299, 000. 00	43, 740. 00
	94, 000	1, 482, 000. 00	2, 726, 500. 00		712, 000. 00	433, 000. 00	31, 260. 00
		5, 998, 000. 00	2, 002, 250. 00		189, 000. 00	258, 000. 00	48, 120. 00
	636, 500	2, 074, 000. 00	421, 000. 00		97, 000. 00	45, 000. 00	10, 950. 00
	733, 930	1, 032, 850. 00	312, 350. 00		78, 700. 00	92, 950. 00	8, 610. 00
	78, 500	2, 078, 950. 00	1, 237, 650. 00		209, 650. 00	164, 050. 00	14, 940. 00
	12, 090	802, 175. 00	249, 887. 50		102, 830. 00	74, 627. 50	10, 906. 50
	27, 660	709, 830. 00	48, 015. 00		17, 196. 00	5, 923. 00	643. 80
	31, 170	518, 785. 00	28, 517. 50		26, 907. 00	4, 523. 50	14. 10
	47, 000	593, 450. 00	25, 075. 00		18, 550. 00	6, 675. 00	255. 00
	49, 625	899, 812. 50	11, 381. 25		14, 372. 50	6, 536. 25	681. 75
	60, 325	810, 162. 50	17, 156. 25		14, 662. 50	6, 431. 25	138. 75
	182, 700	769, 100. 00	31, 625. 00		72, 625. 00	18, 295. 00	123. 00
	424, 300	725, 950. 00	23, 150. 00		70, 660. 00	21, 930. 00	153. 00
	5, 053, 440	95, 509, 284. 50	21, 727, 878. 00		8, 376, 184. 10	4, 529, 818. 90	1, 281, 762. 90

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION—Continued.

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
Brought forward	\$560,502,480	\$54,819,680	\$67,470,880	\$1,149,123	\$26,065,402.50	\$19,040,007
1870.....	22,819,480	164,430	143,550	10,605	51,387.50	9,335
1871.....	20,456,740	254,650	245,000	3,990	68,375.00	3,930
1872.....	21,230,600	244,500	275,350	6,090	52,575.00	3,530
1873.....	55,456,700	173,680	754,605	75	512,562.50	125,125
1874.....	33,917,700	799,270	203,530	125,460	9,850.00	198,820
1875.....	32,737,820	78,350	105,240	60	30,050.00	420
1876.....	46,386,920	104,280	61,820	135	23,052.50	3,245
1877.....	43,504,700	211,490	182,660	4,464	92,630.00	3,920
1878.....	45,916,500	1,031,440	1,427,470	246,972	1,160,650.00	3,020
1879.....	28,889,260	6,120,320	3,727,155	9,090	331,225.00	3,030
1880.....	17,749,120	21,715,160	22,831,765	3,108	7,490.00	1,636
1881.....	14,585,200	48,796,250	33,458,430	1,650	1,700.00	7,660
1882.....	23,295,400	24,740,640	17,831,885	4,620	10,100.00	5,040
1883.....	24,980,040	2,595,400	1,647,990	2,820	4,900.00	10,840
1884.....	19,944,200	2,110,800	1,922,250	3,318	4,982.50	6,206
1885.....	13,875,560	4,815,270	9,065,030	2,730	2,217.50	12,205
1886.....	22,120	10,621,600	18,282,160	3,426	10,220.00	6,016
1887.....	5,662,420	8,706,800	9,560,435	18,480	15,705.00	8,543
1888.....	21,717,320	8,030,310	1,560,980	15,873	40,245.00	16,080
1889.....	16,995,120	4,298,850	37,825	7,287	44,120.00	30,729
1890.....	19,399,080	755,430	290,640	.....	22,032.50	.....
1891.....	25,891,340	1,956,000	1,347,065	.....	27,600.00	.....
1892.....	19,238,760	9,817,400	5,724,700	.....	6,362.50	.....
1893.....	27,178,320	20,132,450	9,610,985	.....	75,265.00	.....
1894.....	48,350,800	26,032,780	5,152,275	.....	10,305.00	.....
1895.....	45,163,120	7,148,260	7,289,680	.....	15,297.50	.....
1896.....	43,931,760	2,000,980	1,072,315	.....	48,005.00	.....
1897.....	57,070,220	12,774,090	6,109,415	.....	74,760.00	.....
1898.....	54,912,900	12,857,970	10,154,475	.....	60,412.50	.....
1899.....	73,593,680	21,403,520	16,278,645	.....	68,375.00	.....
1900.....	86,681,680	3,749,600	8,673,650	.....	168,012.50	.....
1901.....	34,150,520	46,036,160	21,320,200	.....	228,307.50	.....
Total	1,606,207,580	365,097,810	283,820,055	1,619,376	29,344,175.00	19,499,337

^a Includes \$475,000 in Columbian coins. ^b Includes \$2,026,052.50 in Columbian coins.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	\$5,053,440	\$95,509,284.50	\$21,727,878.00	.....	\$8,376,184.10	\$1,529,818.90	\$1,281,762.90
.....	415,462	829,758.50	23,935.00	.....	52,150.00	26,830.00	120.00
.....	1,117,136	1,741,655.00	53,255.50	.....	109,371.00	82,193.00	127.80
.....	1,118,600	866,775.00	68,762.50	.....	261,015.00	189,247.50	58.50
\$1,225,000	296,600	1,593,780.00	414,190.50	.....	413,329.10	51,830.00	18.00
4,910,000	.....	1,406,650.00	215,975.00	.....	319,151.70	.....	.....
6,279,600	.....	5,117,750.00	1,278,375.00	\$265,598	2,406,570.00	.....	.....
6,192,150	.....	7,451,575.00	7,839,287.50	5,180	3,015,115.00	.....	.....
13,092,710	.....	7,540,255.00	6,024,927.50	102	1,735,051.00	.....	.....
4,259,900	22,495,550	726,200.00	819,200.00	120	187,880.00	.....	.....
1,541	27,560,100	2,950.00	3,675.00	.....	1,510.00	.....	.....
1,987	27,397,355	4,877.50	3,738.75	.....	3,735.50	.....	.....
960	27,927,975	5,487.50	3,243.75	.....	2,497.50	.....	.....
1,097	27,574,100	2,750.00	4,075.00	.....	391,110.00	.....	.....
979	28,470,039	4,519.50	3,859.75	.....	767,571.20	.....	.....
.....	28,136,875	2,637.50	2,218.75	.....	393,134.90	.....	.....
.....	28,697,767	3,065.00	3,632.50	.....	257,711.70	.....	.....
.....	31,423,886	2,943.00	1,471.50	.....	658,409.40	.....	.....
.....	33,611,710	2,855.00	2,677.50	.....	1,573,838.90	.....	.....
.....	31,990,833	6,416.50	306,708.25	.....	721,648.70	.....	.....
.....	34,651,811	6,355.50	3,177.75	.....	835,338.90	.....	.....
.....	38,043,004	6,295.00	20,147.50	.....	1,133,461.70	.....	.....
.....	23,562,735	100,300.00	1,551,150.00	.....	2,304,671.60	.....	.....
.....	6,333,245	^a 1,652,136.50	2,960,331.00	.....	1,695,365.50	.....	.....
.....	1,455,792	^b 4,003,948.50	^c 2,583,837.50	.....	759,219.30	.....	.....
.....	3,093,972	3,667,831.00	2,233,448.25	.....	205,099.60	.....	.....
.....	862,880	2,354,652.00	2,255,390.25	.....	225,088.00	.....	.....
.....	19,876,762	1,507,855.00	1,386,700.25	.....	318,581.80	.....	.....
.....	12,651,731	2,023,315.50	2,524,440.00	.....	1,287,810.80	.....	.....
.....	14,426,735	3,094,642.50	3,497,331.75	.....	2,015,324.20	.....	.....
.....	15,182,846	4,474,628.50	3,994,211.50	.....	2,409,833.90	.....	.....
.....	^d 25,010,912	5,033,617.00	3,822,874.25	.....	2,477,918.20	.....	.....
.....	^d 25,010,912	5,033,617.00	3,822,874.25	.....	2,477,918.20	.....	.....
.....	22,566,813	3,119,928.50	2,644,369.25	.....	2,507,350.00	.....	.....
35,965,924	541,036,666	153,867,690.00	68,308,496.50	271,000	39,852,078.20	4,880,219.40	1,282,087.20

^cIncludes \$10,005.75 in Columbian coins.^dIncludes 50,000 Lafayette souvenir dollars.

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION—Continued.

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1793-1795			
1796			
1797			
1798			
1799			
1800			
1801			
1802			
1803			
1804			
1805			
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1862			
1863			
1864			\$396,950.00
1865		\$341,460.00	272,800.00
1866	\$737,125.00	144,030.00	63,540.00
1867	1,545,475.00	117,450.00	58,775.00
1868	1,440,850.00	97,560.00	56,075.00
1869	819,750.00	48,120.00	30,930.00
Carried forward	4,543,200.00	748,620.00	879,070.00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$10,660.33	\$712.67	\$71,485.00	\$370,683.80	\$11,373.00	\$453,541.80
9,747.00	577.40	77,960.00	77,118.50	10,324.40	165,402.90
8,975.10	535.24	128,190.00	14,550.45	9,510.34	152,250.79
9,797.00	-----	205,610.00	330,291.00	9,797.00	545,698.00
9,045.85	60.83	213,285.00	423,515.00	9,106.68	645,906.68
28,221.75	1,057.65	317,760.00	224,296.00	29,279.40	571,335.40
13,628.37	-----	422,570.00	74,758.00	13,628.37	510,956.37
34,351.00	71.83	423,310.00	58,343.00	34,422.83	516,075.83
24,713.53	489.50	258,377.50	87,118.00	25,203.03	370,698.53
7,568.38	5,276.56	258,642.50	100,340.50	12,844.94	371,827.94
9,411.16	4,072.32	170,367.50	149,388.50	13,483.48	333,239.48
3,480.00	1,780.00	324,505.00	471,319.00	5,260.00	801,084.00
7,272.21	2,380.00	437,495.00	597,448.75	9,652.21	1,044,595.96
11,090.00	2,000.00	284,665.00	684,300.00	13,090.00	982,055.00
2,228.67	5,772.86	169,375.00	707,376.00	8,001.53	884,752.53
14,585.00	1,075.00	501,435.00	638,773.50	15,660.00	1,155,868.50
2,180.25	315.70	497,905.00	608,340.00	2,495.95	1,108,740.95
10,755.00	-----	290,435.00	814,029.50	10,755.00	1,115,219.50
4,180.00	-----	477,140.00	620,951.50	4,180.00	1,102,271.50
3,578.30	-----	77,270.00	561,687.50	3,578.30	642,535.80
-----	-----	3,175.00	17,308.00	-----	20,483.00
28,209.82	-----	-----	28,575.75	28,209.82	56,785.57
39,484.00	-----	-----	607,783.50	39,484.00	647,267.50
31,670.00	-----	242,940.00	1,070,454.50	31,670.00	1,345,064.50
26,710.00	-----	258,615.00	1,140,000.00	26,710.00	1,425,325.00
44,075.50	-----	1,319,030.00	501,680.70	44,075.50	1,864,786.20
3,890.00	-----	189,325.00	825,762.45	3,890.00	1,018,977.45
20,723.39	-----	88,980.00	805,806.50	20,723.39	915,509.89
-----	-----	72,425.00	895,550.00	-----	967,975.00
12,620.00	-----	93,200.00	1,752,477.00	12,620.00	1,858,297.00
14,611.00	315.00	156,385.00	1,564,583.00	14,926.00	1,735,894.00
15,174.25	1,170.00	92,245.00	2,002,090.00	16,344.25	2,110,679.25
23,577.32	-----	131,565.00	2,869,200.00	23,577.32	3,024,342.32
22,606.24	3,030.00	140,145.00	1,575,600.00	25,636.24	1,741,381.24
14,145.00	2,435.00	295,717.50	1,994,578.00	16,580.00	2,306,875.50
17,115.00	-----	643,105.00	2,495,400.00	17,115.00	3,155,620.00
33,592.60	11.00	714,270.00	3,175,600.00	33,603.60	3,923,473.60
23,620.00	-----	798,435.00	2,579,000.00	23,620.00	3,401,055.00
27,390.00	770.00	978,550.00	2,759,000.00	28,160.00	3,765,710.00
18,551.00	600.00	3,954,270.00	3,415,002.00	19,151.00	7,388,423.00
38,784.00	705.00	2,186,175.00	3,443,003.00	39,489.00	5,668,667.00
21,110.00	1,990.00	4,135,700.00	3,606,100.00	23,100.00	7,764,900.00
55,583.00	-----	1,148,305.00	2,096,010.00	55,583.00	3,299,898.00
63,702.00	-----	1,809,765.00	2,333,243.40	63,702.00	4,206,710.40
31,286.61	-----	1,376,847.50	2,209,778.20	31,286.61	3,617,912.31
24,627.00	-----	1,675,482.50	1,726,703.00	24,627.00	3,426,812.50
15,973.67	-----	1,091,857.50	1,132,750.00	15,973.67	2,240,581.17
23,833.90	-----	1,829,407.50	2,332,750.00	23,833.90	4,185,991.40
24,283.20	-----	8,108,797.50	3,834,750.00	24,283.20	11,967,830.70
23,987.52	-----	5,427,670.00	2,235,550.00	23,987.52	7,687,207.52
38,948.04	-----	3,756,447.50	1,873,200.00	38,948.04	5,668,595.50
41,208.00	-----	4,034,177.50	2,558,580.00	41,208.00	6,633,965.54
61,836.69	-----	20,202,325.00	2,374,450.00	61,836.69	22,638,611.69
64,157.99	-----	3,775,512.50	2,040,050.00	64,157.99	5,879,720.49
41,785.00	199.32	9,007,761.50	2,114,950.00	41,984.32	11,164,695.82
44,268.44	199.06	31,981,738.50	1,866,100.00	44,467.50	33,892,306.00
98,897.07	738.36	62,614,492.50	774,397.00	99,635.43	63,488,524.93
50,630.94	-----	56,846,187.50	999,410.00	50,630.94	57,896,228.44
66,411.31	648.47	39,377,909.00	9,077,571.00	67,059.78	48,522,539.78
42,361.56	276.79	25,915,962.50	8,619,270.00	42,638.35	34,577,870.85
15,748.29	282.50	29,387,968.00	3,501,245.00	16,030.79	32,905,243.79
26,904.63	202.15	36,857,768.50	5,142,240.00	27,106.78	42,027,115.28
177,834.56	175.90	32,214,040.00	5,478,760.00	178,010.46	37,870,810.46
246,000.00	-----	22,938,413.50	8,495,370.00	246,000.00	31,679,783.50
364,000.00	-----	14,780,570.00	3,284,450.00	364,000.00	18,429,020.00
205,660.00	-----	23,473,654.00	2,259,390.00	205,660.00	25,938,704.00
101,000.00	-----	83,395,530.00	3,783,740.00	101,000.00	87,280,270.00
280,750.00	-----	20,875,997.50	1,252,516.50	280,750.00	22,409,264.00
498,400.00	-----	22,445,482.00	809,267.80	498,400.00	23,753,149.80
529,737.14	-----	20,081,415.00	609,917.10	926,687.14	21,618,019.24
354,292.86	-----	28,295,107.50	691,005.00	968,552.86	29,954,665.36
98,265.00	-----	31,435,945.00	982,409.25	1,042,960.00	33,461,314.25
98,210.00	-----	23,828,625.00	908,876.25	1,819,910.00	26,557,411.25
102,665.00	-----	19,371,387.50	1,074,343.00	1,697,150.00	22,142,880.50
64,200.00	-----	17,582,987.50	1,266,143.00	963,000.00	19,812,130.50
4,680,577.44	39,926.11	729,047,572.50	136,478,368.40	10,891,393.55	876,417,334.45

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION—Continued.

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
Brought forward.....	\$4,543,200.00	\$748,620.00	\$879,070.00
1870.....	240,300.00	40,050.00	17,225.00
1871.....	28,050.00	18,120.00	14,425.00
1872.....	301,800.00	25,860.00	1,300.00
1873.....	227,500.00	35,190.00	
1874.....	176,900.00	23,700.00	
1875.....	104,850.00	6,840.00	
1876.....	126,500.00	4,860.00	
1877.....			
1878.....	117.50	70.50	
1879.....	1,455.00	1,236.00	
1880.....	997.75	748.65	
1881.....	3,618.75	32,417.25	
1882.....	573,830.00	759.00	
1883.....	1,148,471.05	318.27	
1884.....	563,697.10	169.26	
1885.....	73,824.50	143.70	
1886.....	166,514.50	128.70	
1887.....	763,182.60	238.83	
1888.....	536,024.15	1,232.49	
1889.....	794,068.05	646.83	
1890.....	812,963.60		
1891.....	841,717.50		
1892.....	584,982.10		
1893.....	668,509.75		
1894.....	270,656.60		
1895.....	498,994.20		
1896.....	442,146.00		
1897.....	1,021,436.75		
1898.....	626,604.35		
1899.....	1,301,451.55		
1900.....	1,362,799.75		
1901.....	1,324,010.65		
Total.....	20,131,173.75	941,349.48	912,020.00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$4,680,577.44	\$39,926.11	\$729,047,572.50	\$136,478,368.40	\$10,891,393.55	\$876,417,334.45
52,750.00	23,198,787.50	1,378,255.50	350,325.00	24,927,368.00
39,295.00	21,032,685.00	3,104,038.30	99,890.00	24,236,613.30
40,420.00	21,812,645.00	2,504,488.50	369,380.00	24,686,513.50
116,765.00	57,022,747.50	4,024,747.60	379,455.00	61,426,950.10
141,875.00	35,254,630.00	6,851,776.70	342,475.00	42,448,881.70
135,280.00	32,951,940.00	15,347,893.00	246,970.00	48,546,803.00
79,440.00	46,579,452.50	24,503,307.50	210,800.00	71,293,560.00
8,525.00	43,999,864.00	28,393,045.50	8,525.00	72,401,434.50
57,998.50	49,786,052.00	28,518,850.00	58,186.50	78,363,088.50
162,312.00	39,080,080.00	27,569,776.00	165,003.00	66,814,859.00
389,649.55	62,308,279.00	27,411,693.75	391,395.95	90,111,368.70
392,115.75	96,850,890.00	27,940,163.75	428,151.75	125,219,205.50
385,811.00	65,887,685.00	27,973,132.00	960,400.00	94,821,217.00
455,981.09	29,241,990.00	29,246,968.45	1,604,770.41	60,093,728.86
232,617.42	23,991,756.50	28,534,866.15	796,483.78	53,323,106.43
117,653.84	27,773,012.50	28,962,176.20	191,622.04	56,926,810.74
176,542.90	28,945,542.00	32,086,709.90	343,186.10	61,375,438.00
452,264.83	23,972,383.00	35,191,081.40	1,215,686.26	60,379,150.66
374,944.14	31,380,808.00	33,025,606.45	912,200.78	65,318,615.23
488,693.61	21,413,931.00	35,496,683.15	1,283,408.49	58,194,022.64
571,828.54	20,467,182.50	39,202,908.20	1,384,792.14	61,054,882.84
470,723.50	29,222,005.00	27,518,856.60	1,312,441.00	58,053,302.60
376,498.32	34,787,222.50	12,641,078.00	961,480.42	48,389,780.92
466,421.95	56,997,020.00	8,802,797.30	1,134,931.70	66,934,749.00
167,521.32	79,546,160.00	9,200,350.85	438,177.92	89,184,688.77
383,436.36	59,616,357.50	5,698,010.25	882,430.56	66,196,798.31
390,572.93	47,053,060.00	23,089,899.05	832,718.93	70,975,677.98
504,663.30	76,028,485.00	18,487,297.30	1,526,100.05	96,041,882.35
498,230.79	77,985,757.50	23,034,033.45	1,124,835.14	102,144,626.09
536,000.31	111,344,220.00	26,061,519.90	1,837,451.86	139,243,191.76
668,337.64	99,272,942.50	36,345,321.45	2,031,137.39	137,649,401.34
796,111.43	101,735,187.50	30,838,460.75	2,120,122.08	134,693,770.33
14,811,858.46	39,926.11	2,305,588,333.00	845,464,161.30	36,836,327.80	3,187,888,822.10

INDEX.

A.

	Page.
Abyssinia, coinage of, 1899, 1900, and 1901	370
Africa:	
German East, coinage of, 1899, 1900, and 1901	370
French colonies in, production of gold	296
Gold mines of the Gold Coast	295
Production of gold, 1899, 1900, and 1901	371
Production of gold, details of	294
Alabama, production of:	
Estimate of Director	15
Estimate of W. S. Clanton	14
Statistics of, by W. S. Clanton	198
Alaska, production of:	
Estimate of Director	15
Estimate of Charles G. Yale	14
Statistics of, by Charles G. Yale	61
Algeria, production of	297
American East Indies, production of gold in Philippine Islands	288
Amount and cost of silver bullion purchased, used in coinage of silver dollars, wasted, sold in sweeps, and seigniorage since 1890	22
Amount, cost, average price, and bullion value of silver dollars since 1878....	22
Appalachian Range, production of:	
Estimate of Director	15
Estimate of W. S. Clanton	14
Statistics of, by W. S. Clanton	189
Approximate distribution of gold and silver of producing States and Territo- ries, estimate by the Director	15
Approximate gold product:	
Disposition of	13
Mines of United States	12
Approximate silver product:	
Disposition of	13
Mines of United States	13
Arabia, coinage of, 1899 and 1900	370
Argentina:	
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	260
Arizona, production of:	
Estimate of Director	15
Estimate of Charles C. Randolph	14
Statistics of, by Charles C. Randolph	67
Art and manufactures:	
Gold and silver used in the United States	37
Gold and silver used in the world	42
Assets and liabilities, mints and assay offices	330
Australasia:	
Coinage of, 1899, 1900, and 1901	370
Gold and silver production since 1851	290
Gold production, by colonies	289
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	289
Production of fine silver, by colonies	291

Austria-Hungary:	Page.
Coinage of, 1899, 1900, and 1901.....	370
Industrial consumption.....	46
Production of gold and silver, 1899, 1900, and 1901.....	371
Production of gold and silver, details of.....	271
Average, highest, and lowest price of silver.....	32
Average, highest, and lowest price of silver in London since 1833.....	334
Average price, amount, cost, and bullion value of silver dollar since 1878.....	22

B.

Balance of silver bullion on hand January 1, 1902.....	23
Bars:	
Gold exchanged for gold coin.....	40
Furnished for use in the arts since 1880.....	41
Manufactured at mints and assay offices.....	22
Manufactured at mints and assay offices, tables of.....	320
Belgium:	
Coinage of, 1899 and 1901.....	370
Industrial consumption.....	46
Production of, details of.....	271
Bolivia:	
Coinage of, 1899 and 1901.....	370
Production of gold and silver, 1899, 1900, and 1901.....	371
Production of gold and silver, details of.....	257
Borneo, production of gold in.....	284
Brazil:	
Coinage of, 1899.....	370
Industrial consumption.....	46
Mining in.....	252
Production of gold, 1899, 1900, and 1901.....	371
Production of gold, details of.....	251
British colonies in Africa, production of gold.....	294
British Columbia:	
Production, details of.....	222
British East Indies, production of:	
1899, 1900, and 1901.....	371
Production, details of.....	284
Malay States.....	284
New Guinea.....	284
British Guiana:	
Coinage of, 1900 and 1901.....	370
Production of gold, 1899, 1900, and 1901.....	371
Details of.....	246
British Honduras, coinage of, 1901.....	370
British India:	
Coinage of, 1899, 1900, and 1901.....	370
Production of gold, 1899, 1900, and 1901.....	371
Production of gold, details of.....	292
British North America, gold and silver production, details of.....	219
Bullion:	
In mints and assay offices, January 1, 1902.....	36
Silver, average, highest, and lowest price.....	32
Silver, balance on hand January 1, 1902.....	23
Bullion value of silver dollar, amount, cost, and average price since 1878.....	22

C.

California, production of:	
Estimate of Director.....	15
Estimate of Charles G. Yale.....	14
Statistics of, by Charles G. Yale.....	90
Canada:	
Coinage of, 1899, 1900, and 1901.....	370
Production of gold and silver, 1899, 1900, and 1901.....	371
Production of gold and silver since 1886.....	219
Production of gold and silver, details of.....	219
Cape Colony, gold production of.....	296

Central America, production of gold and silver:	Page.
1899, 1900, and 1901	371
Details of	240
Industrial consumption	46
Ceylon, coinage of, 1899 and 1900	370
Chile:	
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	259
China:	
Production of gold, 1899, 1900, and 1901	371
Production of gold, details of	277
Circulation of money in the United States, January 1, 1902	37
Coin subsidiary, cost of silver purchased	22
Coinage:	
United States, calendar year	21
United States, 1899, 1900, and 1901	370
United States since 1873, by weight and value	21
United States since organization of Mint, 1792	376
World, 1899, 1900, and 1901	49
World, 1899, 1900, and 1901, table of	370
World since 1873, by weight and value	50
Colombia:	
Exports of gold and silver	244
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	244
Colorado, production of:	
Estimate of Director	15
Estimate of J. L. Hodges	14
Statistics of, by J. L. Hodges	104
Commercial value of silver	32
Commercial ratio of silver to gold since 1687	335
Cost, amount, average price, and bullion value of silver dollar since 1878	22
Cost of silver purchased for subsidiary coinage	22
Costa Rica, coinage of, 1899 and 1900	370
Course of silver	32
Crete, coinage of, 1901	370
Curaçao, coinage of, 1900 and 1901	370
Cyprus, coinage of, 1900	370

D.

Denmark, coinage of, 1899 and 1900	370
Deposits of gold and silver:	
At mints and assay offices	17
At mints and assay offices, since 1880	20
Distribution:	
Approximate, of gold and silver, by producing States and Territories, estimate of Director	15
Of gold and silver product by agents	14
Of gold and silver, by States and Territories	15
Dollar, silver, amount, cost, average price, and bullion value since 1878	22
Dutch East Indies:	
Coinage of, 1900 and 1901	370
Production of gold in Borneo	284
Dutch Guiana, production of gold:	
1899, 1900, and 1901	371
Details of	247

E.

East India, British, production in New Guinea	284
East Indies:	
American, production of gold in Philippine Islands	288
British, production of gold, 1899, 1900, and 1901	371
British, production of Malay States	284
Dutch, production of gold, 1899, 1900, and 1901	371
Dutch, production of gold in Borneo	284
Dutch, production of gold in Sumatra	285
Dutch, production of gold in Celebes	285

Ecuador:	Page.
Coinage of, 1899 and 1900	370
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	250
Egypt:	
Coinage of, 1900 and 1901	370
Industrial consumption	46
Employment of gold and silver in industrial arts in—	
United States	37
World	42
Estimate of Director of gold and silver product of the United States	15
Exports and imports:	
Gold and silver bullion into and from London	34
Gold and silver bullion and coin	23
Gold and silver bullion and coin, tables of	336
Principal countries of the world	27
Exports:	
Gold and silver from Mexico	238
Gold and silver from Colombia	245
Exports of silver to the East	33
F.	
Finland:	
Industrial consumption	46
Production, details of	267
Production of, 1899, 1900, and 1901	371
Fluctuation in price of silver	32
Form and distribution of stock of money in United States, January 1, 1902	37
France:	
Coinage of, 1899, 1900, and 1901	370
Industrial consumption	46
Production of silver, 1899, 1900, and 1901	371
Production of silver, details of	272
French colonies in Africa, gold production of	296
French Guiana, production of gold:	
1899, 1900, and 1901	371
Details of	247
Future supply of gold, by N. S. Shaler	51
G.	
Georgia, production of:	
Estimate of Director	15
Estimate of W. S. Clanton	14
Statistics by W. S. Clanton	196
German East Africa, coinage of, 1899, 1900, and 1901	370
Germany:	
Coinage of, 1899, 1900, and 1901	370
Industrial consumption	46
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	269
Gold and silver:	
Approximate distribution, by States, and estimate of Director	15
Bullion in mints and assay offices January 1, 1902	36
Bullion imported and exported into and from London	34
Coinage, by nations, 1899, 1900, and 1901	49
Coinage, by nations, 1899, 1900, and 1901, tables of	370
Coinage of world, weight and value since 1873	50
Deposits of	17
Product of mines of the United States since 1860	16
Product of United States, estimate of agents	14
Product of the United States, estimate of the Director	15
Product of world, weight and value since 1860	49
Production of Argentina	260
Production of Australasia	289
Production of Austria-Hungary	271
Production of British North America	219

	Page.
Gold and silver—Continued.	
Production of Bolivia.....	257
Production of Central America.....	240
Production of Colombia.....	244
Production of Chile.....	259
Production of Ecuador.....	250
Production of Finland.....	267
Production of Germany.....	269
Production of Great Britain.....	269
Production of Italy.....	275
Production of Japan.....	283
Production of Mexico.....	228
Production of Peru.....	254
Production of Portugal.....	275
Production of Russia.....	262
Production of Spain.....	273
Production of Sweden.....	268
Production of Turkey.....	276
Production in the world.....	47
Received at mints and assay offices since 1880.....	20
Used in industrial arts in the United States.....	37
Gold:	
Bars exchanged for gold coin.....	40
Bars manufactured at mints and assay offices.....	22
Bars manufactured at mints and assay offices, table of.....	320
Bullion deposited at mints and assay offices.....	17
Bullion deposited at mints and assay offices since 1880.....	20
Bullion, stock of, in United States, January 1, 1902.....	36
Coinage of the mints of the world since 1873.....	21
Coinage of United States.....	21
Coinage of United States, table of.....	328
Coinage of United States since 1873, weight and value.....	21
Coinage of United States from organization of Mint, 1792.....	376
Coinage of various countries, 1899, 1900, and 1901, table of.....	370
Deposits at mints and assay offices.....	17
Imports and exports.....	23
Imports and exports, 1901, tables of.....	336
Imported from West Coast of Africa into England since 1889.....	295
Philippine Islands.....	288
The Transvaal.....	294
The future supply of, by N. S. Shaler.....	51
Mines of the Gold Coast, Africa.....	298
Mines of Italian East Africa.....	305
Mines of Madagascar.....	302
Mines of Siberia.....	264
Mining in the Colar Fields of Mysore, India.....	283
Mining industry of Spain.....	273
Movement from United States.....	26
Product of mines of United States since 1860.....	16
Product of mines of United States, approximate.....	9
Product of mines of United States, approximate disposition.....	15
Product of mines distributed by States and Territories.....	15
Product of mines reported by mint officers and agents.....	14
Production of United States, 1899, 1900, and 1901, table of.....	371
Production of the United States, 1901.....	9
Production of the United States, 1901, estimate of Director.....	15
Production of the United States, 1901, by placer and quartz mining.....	15
Production of the world.....	47
Production of the world, table of.....	371
Production of the world since 1860, by weight and value.....	49
Production of Africa.....	294
Production of Brazil.....	251
Production of British East Indies.....	284
Production of British India.....	282
Production of Dutch East Indies.....	284
Production of Cape Colony.....	296

Gold—Continued.	Page.
Production of China.....	277
Production of French colonies of Africa.....	296
Production of Klondike.....	220
Production of Korea.....	281
Production of Madagascar.....	296
Production of Nova Scotia.....	220
Production of Rhodesia.....	295
Production of Transvaal.....	294
Production of Uruguay.....	261
Production of Venezuela.....	249
Production of Western Australia since 1886.....	290
Production of British Guiana.....	246
Production of Dutch Guiana.....	247
Production of French Guiana.....	247
Used for industrial purposes in United States.....	37
Used for industrial purposes in United States since 1880.....	41
Used for industrial purposes in world.....	42
Gold Coast of Africa, gold mines in.....	298
Government purchases of silver.....	22
Great Britain:	
Coinage of, 1899, 1900, and 1901.....	370
Industrial consumption.....	46
Production of gold and silver, 1899, 1900, and 1901.....	371
Production of gold and silver, details of.....	269
Greece:	
Production of silver, 1899, 1900, and 1901.....	371
Production of silver, details of.....	276
Guatemala, coinage of, 1901.....	370
Guiana, British: Production of gold—	
1899, 1900, and 1901.....	371
Details of.....	246
Guiana, Dutch: Production of gold—	
1899, 1900, and 1901.....	371
Details of.....	247
Guiana, French: Production of gold—	
1899, 1900, and 1901.....	371
Details of.....	247
H.	
Highest, lowest, and average price of silver in:	
United States.....	32
London since 1833.....	334
Honduras, British, coinage of, 1901.....	370
Hongkong coinage, 1899, 1900, and 1901.....	370
Hungary, industrial consumption.....	46
I.	
Idaho, production of:	
Estimate of Director.....	15
Estimate of J. W. Cunningham.....	14
Statistics of, by J. W. Cunningham.....	149
Imports of silver into India, value of.....	34
Imports and exports:	
Gold and silver.....	23
Gold and silver bullion into and from London.....	34
Gold and silver, tables of.....	336
Gold into England from west coast of Africa since 1889.....	295
Principal countries of the world.....	27
India:	
British, coinage of, 1899, 1900, and 1901.....	370
Industrial consumption.....	43
Mining in Colar gold fields of Mysore.....	283
Production of gold, 1899, 1900, and 1901.....	371
Production of gold, details of.....	282
Value of silver imports into.....	34
Indo-China coinage, 1899, 1900, and 1901.....	370

Industrial arts:	Page.
Gold and silver used in United States.....	37
Consumption of gold and silver in the world	42
Italy:	
Coinage of 1899, 1900, and 1901.....	370
Industrial consumption	46
Production of gold and silver, 1899, 1900, and 1901.....	371
Production of gold and silver, details of.....	275
Italian East Africa, gold mines of.....	305
J.	
Japan:	
Coinage of, 1899, 1900, and 1901.....	370
Production of gold and silver, 1899, 1900, and 1901.....	371
Production of gold and silver, details of	283
K.	
Klondike:	
Production of gold	220
Korea:	
Coinage of, 1901.....	370
Production of gold, 1899, 1900, and 1901	371
Production of gold, details of.....	281
L.	
Letter of transmittal	5
Liabilities and assets, mints and assay offices	330
Lichtenstein, coinage of, 1899	370
Location of moneys of United States	37
M.	
Madagascar gold production.....	296
Market for silver.....	32
Maryland, production of:	
Estimate of Director.....	15
Estimate of W. S. Clanton.....	14
Statistics of, by W. S. Clanton	191
Mauritius, coinage of, 1899.....	370
Metallic stock.....	36
Mexico:	
Coinage of, 1899, 1900, and 1901.....	370
Exports of gold and silver	238
Mining industry in.....	229
Production of gold and silver, 1899, 1900, and 1901.....	371
Production of gold and silver, details of.....	228
Michigan, production of, estimate of Director	15
Minerals of the Philippine Islands.....	288
Mining:	
In Brazil	252
In Colar gold fields of Mysore, India	283
Industry in Mexico	229
Minor coinage of United States.....	21
Monaco, coinage of, 1901.....	370
Money in United States, stock of.....	36
Moneys of United States, metallic and paper, location of.....	37
Montana, production of:	
Estimate of Director.....	15
Estimate of B. H. Tatem.....	14
Statistics of, by B. H. Tatem.....	151
Morocco, coinage of, 1899, 1900, and 1901.....	370
Movement of gold from the United States.....	26
Mines of United States:	
Approximate gold product of	12
Approximate disposition of product	13
Gold and silver product since 1860	16
N.	
New South Wales, production of	289
New Zealand, production of	289

Netherlands:	Page.
Coinage of, 1899, 1900, and 1901	370
Industrial consumption	46
Production of, details of	271
Nevada, production of:	
Estimate of Director	15
Estimate of R. K. Colcord	14
Statistics of, by R. K. Colcord	159
The Comstock lode, by Alfred Doten	163
Tonopah mining district, by Alfred Doten	172
Newfoundland:	
Coinage of, 1899 and 1900	370
Production of gold and silver, 1899	371
New Guinea, production of gold	284
New Mexico, production of:	
Estimate of Director	15
Estimate of J. L. Hodges	14
Statistics of, by R. E. Towne	178
Statistics of, by J. L. Hodges	183
North Carolina, production of:	
Estimate of Director	15
Estimate of W. S. Clanton	14
Statistics of, by W. S. Clanton	192
Norway:	
Coinage of, 1899, 1900, and 1901	370
Production of silver, 1899, 1900, and 1901	371
Production of silver, details of	267
Northwest Territories, production of gold	220
Notes of United States outstanding January 1, 1902	37
Nova Scotia, gold production of	220
O.	
Ontario, production of gold	220.
Oregon, production of:	
Estimate of Director	15
Estimate of F. A. Wing	14
Statistics of, by F. A. Wing	185
P.	
Paper money in circulation in United States, January 1, 1902	37
Paraguay:	
Industrial consumption	46
Production of	261
Persia, coinage of, 1901	370
Peru:	
Coinage of, 1899, 1900, and 1901	370
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	254
Philippine Islands, gold in	288
Porto Rico, production of	240
Portugal:	
Coinage of, 1899, 1900, and 1901	370
Industrial consumption	46
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	275
Price of silver	32
Production of gold in—	
Africa	294
American East Indies	288
Brazil	251
British colonies in Africa	294
British East Indies	284
British India	282
British Guiana	246
China	277

Production of gold in—Continued.	Page.
Dutch East Indies.....	284
Dutch Guiana.....	247
French colonies in Africa.....	296
French Guiana.....	247
Korea.....	281
Klondike.....	220
Madagascar.....	296
Malay States.....	284
Netherlands.....	272
New South Wales.....	289
Northwest Territories.....	220
Nova Scotia.....	220
Ontario.....	220
Philippine Islands.....	288
Quebec.....	220
Rhodesia.....	295
Siam.....	282
The Guianas.....	246
The Transvaal.....	294
Uruguay.....	261
Venezuela.....	249
Western Australia.....	289
Cape Colony.....	296
Product of gold mines of United States since 1860.....	16
Production of gold and silver in—	
Alabama, estimate of Director.....	15
Alabama, estimate of W. S. Clanton.....	14
Alabama, statistics of, by W. S. Clanton.....	198
Alaska, estimate of Director.....	15
Alaska, estimate of Charles G. Yale.....	14
Alaska, statistics of, by Charles G. Yale.....	61
Arizona, estimate of Director.....	15
Arizona, estimate of Charles C. Randolph.....	14
Arizona, statistics of, by Charles C. Randolph.....	67
California, estimate of Director.....	15
California, estimate of Charles G. Yale.....	14
California, statistics of, by Charles G. Yale.....	90
Colorado, estimate of Director.....	15
Colorado, estimate of J. L. Hodges.....	14
Colorado, statistics of, by J. L. Hodges.....	104
Georgia, estimate of Director.....	15
Georgia, estimate of W. S. Clanton.....	14
Georgia, statistics of, by W. S. Clanton.....	196
Idaho, estimate of Director.....	15
Idaho, estimate of J. W. Cunningham.....	14
Idaho, statistics of, by J. W. Cunningham.....	149
Maryland, estimate of Director.....	15
Maryland, estimate of W. S. Clanton.....	14
Maryland, statistics of, by W. S. Clanton.....	191
Michigan, estimate of Director.....	15
Montana, estimate of Director.....	15
Montana, estimate of B. H. Tatem.....	14
Montana, statistics of, by B. H. Tatem.....	151
Nevada, estimate of Director.....	15
Nevada, estimate of R. K. Colcord.....	14
Nevada, statistics of, by R. K. Colcord.....	159
New Mexico, estimate of Director.....	15
New Mexico, estimate of J. L. Hodges.....	14
New Mexico, statistics of, by J. L. Hodges.....	183
New Mexico, statistics of, by R. E. Towne.....	178
North Carolina, estimate of Director.....	15
North Carolina, estimate of W. S. Clanton.....	14
North Carolina, statistics of, by W. S. Clanton.....	192
Oregon, estimate of Director.....	15
Oregon, estimate of F. A. Wing.....	14
Oregon, statistics of, by F. A. Wing.....	185

Production of gold and silver in—Continued.	Page.
South Carolina, estimate of Director	15
South Carolina, estimate of W. S. Clanton	14
South Carolina, statistics of, by W. S. Clanton	195
South Dakota, estimate of Director	15
South Dakota, estimate of F. R. Carpenter	14
South Dakota, statistics of, by F. R. Carpenter	200
Tennessee, estimate of Director	15
Tennessee, estimate of W. S. Clanton	14
Tennessee, statistics of, by W. S. Clanton	199
Texas, estimate of Director	15
United States, 1899, 1900, and 1901	371
United States, details of	9
United States, since 1860	16
United States, by States and Territories	15
United States, by Mint officers and agents	14
United States, placer and quartz mining	15
Utah, estimate of Director	15
Utah, estimate of B. H. Tatem	14
Utah, statistics of, by B. H. Tatem	203
Virginia, estimate of Director	15
Virginia, estimate of W. S. Clanton	14
Virginia, statistics of, by W. S. Clanton	191
Washington, estimate of Director	15
Washington, estimate F. A. Wing	14
Washington, statistics of, by F. A. Wing	212
Wyoming, estimate of Director	15
Wyoming, estimate of F. R. Carpenter	14
Wyoming, statistics of, by F. R. Carpenter	216
World, 1899, 1900, and 1901	371
World, since the discovery of America, table of	374
World	47
World, since 1860, weight and value	49
Production of silver in the United States—	
1901	13
Since 1860	16
By States and Territories	15
Estimate of Director	15
Reported by Mint officers and agents	14
Production—	
Of fine silver in Australasia, by colonies	290
Foreign countries	219
Foreign countries, table of	371
Algeria	297
Argentina	260
Australasia	289
Austria-Hungary	271
Belgium	271
British North America	219
Bolivia	257
Central America	240
Colombia	244
Chile	259
Ecuador	250
Germany	269
Great Britain	269
Italy	275
Japan	283
Mexico	228
New Zealand	289
Paraguay	261
Peru	250
Porto Rico	240
Portugal	275
Russia	262
Spain	273
Sweden	268

Production—Continued.	Page.
Turkey	276
Uruguay	261
Venezuela	249
Production of silver—	
France	272
Greece	276
Norway	268
Product of—	
Mines of United States, approximate disposition of	13
Silver mines of United States	12
Purchase of silver	22
Purchase of silver and cost of, for subsidiary coin	22
Q.	
Queensland:	
Production of gold	293
Quebec:	
Production of gold	220
R.	
Ratio of silver to gold each year since 1687	335
Reports of special agents on production of precious metals in the States and Territories	59
Rhodesia:	
Production of gold	295
Russia:	
Coinage of, 1899, 1900, and 1901	370
Industrial consumption	46
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	262
S.	
San Marino, coinage of, 1899	370
San Salvador, industrial consumption	46
Santo Domingo, coinage of, 1899	370
Sarawak, coinage of 1900	370
Seigniorage on coinage of silver dollars wasted, sold in sweeps, since 1890	23
Siam:	
Coinage of, 1899, 1900, and 1901	370
Production of	282
Siberia, gold mines of	264
Silver and gold:	
Approximate distribution by States and Territories, estimate of Director ..	15
Bullion in the mints and assay offices January 1, 1902	36
Bullion imported and exported into and from London	34
Coinage of world since 1873	50
Production by States, reported by agents	14
Production of mines of United States since 1860	16
Production of the world	47
Received at mints and assay offices since 1880	20
Production in the world since 1860	49
Production in the world, 1899, 1900, and 1901, tables of	371
Silver:	
Average price of, 1901	32
Bars furnished for use in the arts	37
Bars manufactured at mints and assay offices	22
Bars manufactured at mints and assay offices, tables of	320
Bullion, balance on hand January 1, 1902	23
Bullion deposited at mints and assay offices	19
Bullion in mints and assay offices	23
Bullion, value of fine ounce	32
Bullion wasted, coined, and seigniorage since 1890	23
Coinage of United States	21
Coinage of United States since 1873, weight and value	21
Coinage of various countries, 1899, 1900, and 1901, tables of	370

Silver—Continued.	Page.
Course of	32
Deposits of	19
Dollars, amount, cost, average price, and bullion value since 1878	23
Exports to the East	33
Highest, lowest, and average price of	33
Highest, lowest, and average price of, in London, since 1833	334
Imports into India, value of	34
Imports and exports	23
Imports and exports, table of	336
Market for	32
Product of mines of United States	12
Product of mines of United States since 1860	16
Product of mines of United States, disposition of	13
Product of mines distributed, by States and Territories	15
Product of mines reported by Mint officers and agents	14
Production of, in United States, 1899, 1900, and 1901	371
Production of, in United States, 1901	13
Production of, in United States, estimate of Director	15
Production of world	47
Production of world since 1860, weight and value	49
Production in foreign countries	219
Production of France	272
Production of Greece	276
Production of Norway	267
Production of Canada	220
Production of British Columbia	220
Production of British North America	219
Purchases	22
Purchase of subsidiary coin, cost of	22
Used in industrial arts in the United States	37
Used in the industrial arts in the United States since 1880	41
Used in the industrial arts in the world	42
South Appalachian States, production of:	
Estimate of Director	15
Estimate of W. S. Clanton	14
Statistics of, by W. S. Clanton	189
South Carolina, production of:	
Estimate of Director	15
Estimate of W. S. Clanton	14
Statistics of, by W. S. Clanton	195
South Dakota, production of:	
Estimate of Director	15
Estimate of F. R. Carpenter	14
Statistics of, by F. R. Carpenter	200
Spain:	
Coinage of, 1899 and 1900	370
Mining industry of	273
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	273
Straits Settlement, coinage of, 1899, 1900, and 1901	370
Stock of money in the United States	36
Subsidiary coin, cost of silver purchased for	22
Sweden:	
Coinage of, 1899, 1900, and 1901	370
Industrial consumption	46
Production of gold and silver, details of	268
Production of gold and silver, 1899, 1900, and 1901	371
Switzerland:	
Coinage of, 1899, 1900, and 1901	370
Industrial consumption	46

T.

Tables:	
Amount and cost of silver bullion purchased, used in coinage, and sold in sweeps	326
Assets and liabilities, mints and assay offices	330

Tables—Continued.

	Page.
Bars, manufactured, standard ounces	320
Bars, manufactured, value	320
Coinage, United States	328
Coinage, United States, by institutions, since 1792	378
Coinage, United States, fractional and subsidiary, since 1792	377
Coinage, United States, since organization of Mint, by denominations and value	376
Coinage, various countries, 1899, 1900, and 1901	370
Domestic coins for recoinage	322
Deposits and purchases of gold and silver, standard ounces	312
Deposits and purchases of gold and silver, value	314
Deposits of unrefined gold, standard ounces	316
Deposits of unrefined gold, value	316
Deposits of unrefined gold and silver, from organization of Mint	332
Deposits of unrefined silver, standard ounces	318
Deposits of unrefined silver, value	318
Highest, lowest, and average price of silver in London since 1833	334
Imports and exports of gold and silver	336
Imports and exports, principal countries of the world	345
Production of gold and silver in the world from 1492	374
Production of gold and silver in the United States since 1792	333
Production of gold and silver in the world, 1899, 1900, and 1901	371
Quantity and cost of metal obtained by transfer and purchase for subsidiary coinage	325
Quantity and cost of silver used in coinage of silver dollars	324
Ratio of silver to gold each year since 1687	335
Recoinage of the United States	322
Silver for subsidiary coinage	325
Unrefined domestic gold and silver deposited by the States and Territories since 1792	332
Tennessee:	
Production of, estimate of W. S. Clanton	14
Production of, statistics of, by W. S. Clanton	199
Texas, production of, estimate of Director	15
Transvaal, production of gold	294
Tunis, coinage of, 1899, 1900, and 1901	370
Turkey:	
Coinage of, 1899, 1900, and 1901	370
Production of gold and silver, 1899, 1900, and 1901	371
Production of gold and silver, details of	276
The Guianas, production of gold	246
The future supply of gold	51
U.	
United States:	
Approximate disposition of product	13
Coinage of, 1899, 1900, and 1901	370
Coinage of, since 1873	21
Coinage of, 1901	21
Coinage, table of	328
Coinage of, since organization of Mint	376
Money, metallic and paper, location of	37
Production, 1899, 1900, and 1901	371
Production, details of	9
Product of, gold and silver, estimate of Director	15
Product of, gold and silver, estimate of agents	14
Stock of money	36
Use of gold and silver in industrial arts	37
Uruguay, production of gold:	
1899, 1900, and 1901	371
Details of	261
Utah, production of:	
Estimate of Director	15
Estimate of B. H. Tatem	14
Statistics of, by B. H. Tatem	203

V.		Page,
Value of net silver imports into India		34
Venezuela:		
Coinage of, 1900 and 1901		370
Production of gold, details of		249
Production of gold, 1899, 1900, and 1901		371
Virginia, production of:		
Estimate of Director		15
Estimate of W. S. Clanton		14
Statistics of, by W. S. Clanton		191
W.		
Washington, production of:		
Estimate of Director		15
Estimate of F. A. Wing		14
Statistics of, by F. A. Wing		212
Wasted in coinage of silver dollars, sold in sweeps, and seigniorage since 1890 ..		23
Western Australia, gold production of, since 1886		290
World's coinage, 1899, 1900, and 1901		49
World's coinage, 1899, 1900, and 1901, table of		370
World's coinage since 1873, weight and value		50
World's industrial consumption of gold and silver		42
World's production of gold and silver		47
World's production of gold and silver since 1860, weight and value		49
World's production of gold and silver, 1899, 1900, and 1901		371
World's production of gold and silver, details of		219
Wyoming, production of, estimate of Director		15
Estimate of F. R. Carpenter		14
Statistics of, by F. R. Carpenter		216
West Coast of Africa, gold imported into England since 1889		295
Y.		
Yukon and Klondike (<i>see</i> British North America)		219

